



MARCH  
1948



## CONVEYORS

Link-Belt belt conveyor, one of many types available for ore and other minerals.



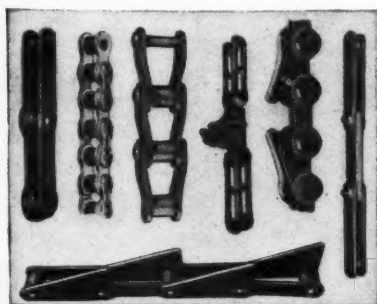
## CONCENTRATORS

Link-Belt Float-Sink Concentrator for cleaning ore and similar minerals.



## CHAINS and SPROCKETS

All types and sizes in malleable iron, Pro-mal, steel, and acid and rust resisting alloys.



## WASHERS

Various types of paddle, screw and flight type washers, dewatering and classifying units.



# LINK-BELT

## Complete Service

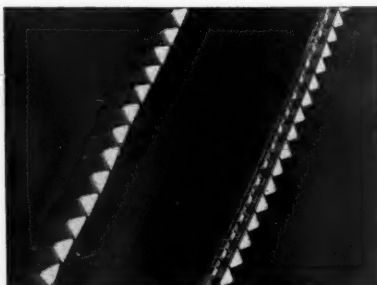
**COST CUTTING FORMULA FOR THE MINING INDUSTRIES:** Link-Belt standard units plus specialized "know-how" for integrating them into operations for high efficiency, high production and low operating and maintenance cost. Link-Belt products and service, backed by more than 70 years of experience, command the respect of all industries the world over. We welcome the opportunity to serve you. Catalogs on any product illustrated or listed will be sent on request.

## LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 19, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Other offices in principal cities.

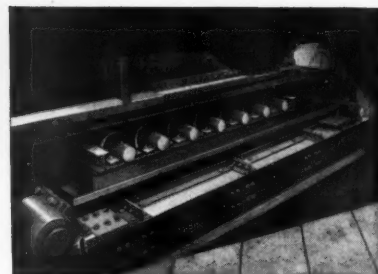
## ELEVATORS

Link-Belt bucket elevators of many types and capacities.



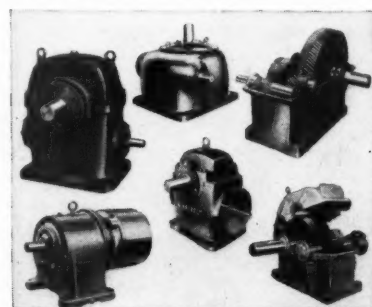
## FEEDERS

A complete line of apron, belt, reciprocating and vibrating feeders, in standard and special sizes.



## SPEED REDUCERS

Link-Belt worm gear, herringbone gear, helical gear speed reducers-increasers, gearmotors and variable speed changers.



## TRANSMISSION UNITS

Complete line, all from one source, one high standard, one responsibility.



## SCREENS

Complete line of vibrating, shaking and revolving screens.



# LINK-BELT

CONVEYORS, MATERIALS HANDLING, PREPARATION  
AND POWER TRANSMISSION MACHINERY

10,940

# Mining

CONGRESS JOURNAL

# Contents

VOLUME 34 NUMBER 3

FOR MARCH 1948

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## FRONT COVER:

Kennecott's Nevada Mines Division produces more than twice as much copper annually as any U. S. competitor.

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# THE JEFFREY MANUFACTURING COMPANY

958-99 North Fourth Street, Columbus 16, Ohio

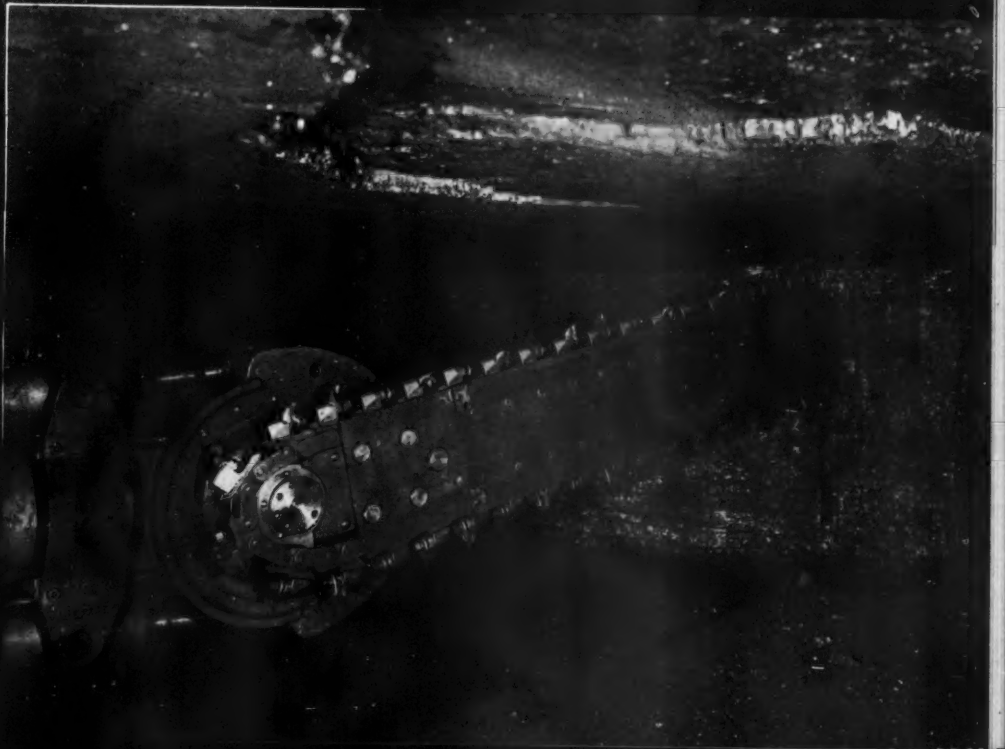
CUTTERS • DRILLS • LOCOMOTIVES • JIGS • FANS • UNDERGROUND CONVEYORS • CRUSHERS





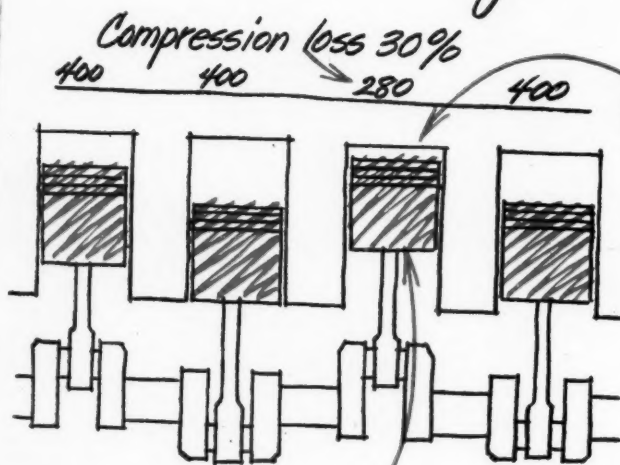


49-38



# LUBE MEMO

*Engine overheating caused  
by stuck rings*



*Hot blowby gases  
burned piston.*

*Shop found rings in  
#2 badly stuck by  
ordinary oil (blowby  
has been wasting power).*

*Foreman claims RPM  
DELO Diesel Engine  
Lubricating Oil's  
compounds will prevent  
stuck rings 3 ways:*

- 1. Decrease carbon*
- 2. Stop formation of gum.*
- 3. Hold contaminants  
in suspension (they're  
flushed out on oil change).*

*Give shop go ahead  
on RPM DELO Oil*



STANDARD OF CALIFORNIA • San Francisco, Calif.  
THE CALIFORNIA COMPANY • Denver, Colo.

THE CALIFORNIA OIL COMPANY • New York  
STANDARD OF TEXAS • El Paso, Texas

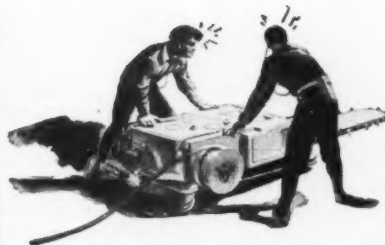
# Famous for Safety and Service...



## *Securityflex*<sup>\*</sup> PARALLEL MINING CABLE

- Cuts Short Circuits
- Meets Pennsylvania Flame Test
- Withstands severe overloads
- Resists abrasion
- Will not kink, twist or tear
- Meets Bureau of Mines diameter specifications

48453



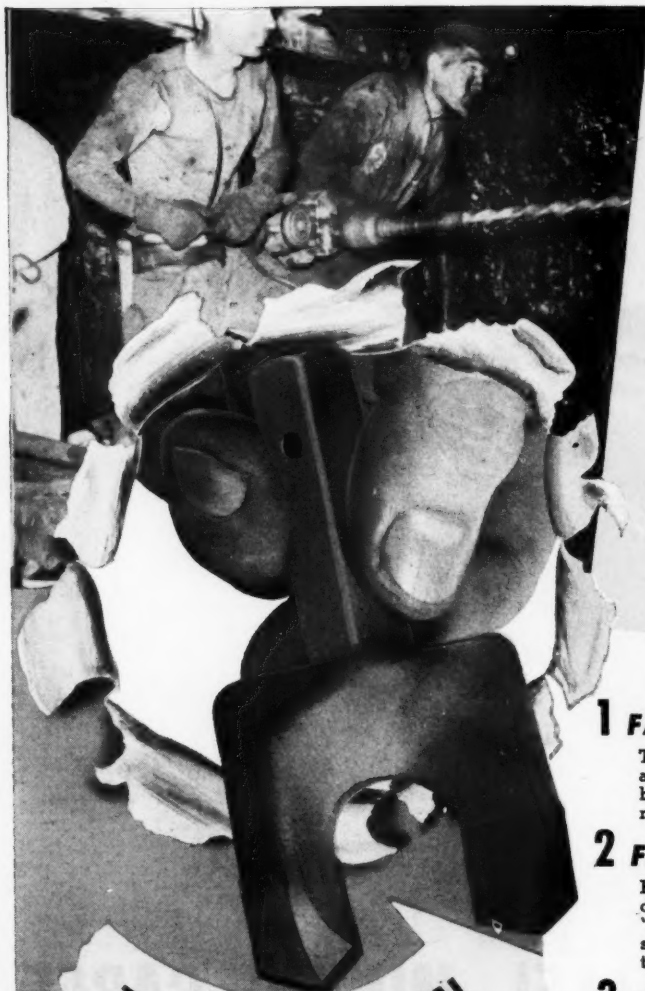
*...Assures uninterrupted mine operation*

\*Reg. U. S. Pat. Off.



**ANACONDA WIRE AND CABLE COMPANY**

25 BROADWAY, NEW YORK 4, N. Y.



**THE HARDEST METAL  
USED IN MINING**

How much do the drill bits you use actually cost when you figure bit life, footage drilled, drilling speed, labor cost, and maintenance on the drilling machine? When all these factors are considered a bit that costs a few cents more at first can save hundreds of dollars in the end. For factual performance data on Kennametal Drill Bits write Mining Division, Kennametal Inc., Latrobe, Pa.

### Is Kennametal Harder Than Steel?

Kennametal is much harder than steel. Its Rockwell C hardness is up to 80.6 against a maximum of 65-66 for the hardest steel. And it must be remembered that differences of even a few points in the upper end of the Rockwell scale are more important than the numerical value indicates. Kennametal's extreme hardness, plus its high compressive strength (up to 800,000 PSI) are the essential factors in its ability to resist abrasion and wear for extended periods of cutting.

# 5 WAYS to Cut Your Drilling Costs *with* **KENNAMETAL Drill Bits**

## 1 FASTER DRILLING

The speed of drilling with a Kennametal bit is, on an average, 50% faster than that with any other type of bit. Tough, hard Kennametal tips cut freely; stay sharp much longer.

## 2 FEWER BIT CHANGES

Kennametal bits last longer; reduce labor costs of handling and changing. Example: Penna. mine reports—"One Kennametal Bit drilled 2700 feet of coal and slate before dulling . . . 300 steel bits were required to do the same job."

## 3 LESS POWER CONSUMPTION

Kennametal Bits drill accurate single-gage holes. It takes approximately half as much work to drill in single gage . . . and substantially less power. Example: Pittsburgh seam—"Machine driven 2 1/4" Kennametal Bit requires 40% less power than steel bits."

## 4 LOWER BIT COSTS

Mason County, W. Va. mine reports—"We formerly used up 160 steel bits during two shifts. Now one Kennametal Bit lasts as long." This is typical—many mines report bit cost reductions of as much as 50% before Kennametal bits become dull. And they can be re-sharpened many times before they are worn out.

## 5 REDUCED MAINTENANCE

Dull bits throw an excessive load on the drill; cause armature failure. Kennametal Bits hold their edge far longer; permit easier cutting at uniform drilling speed; avoid overloading of drill; sharply reduce repair costs. Example: Green County, Pa. mine—"Armature failures averaged 6 to 10 per week before using Kennametal Bits; are now less than one a week."

# KENNAMETAL

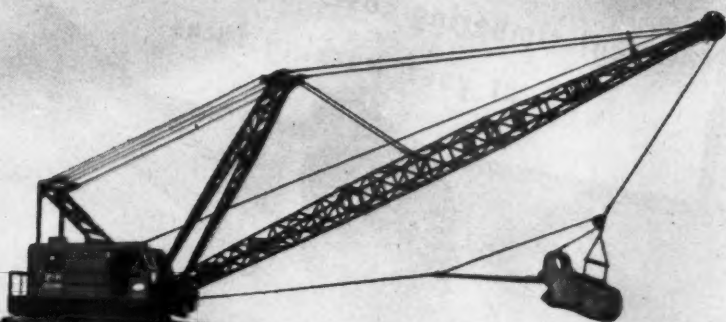
**THE WORLD'S LARGEST MANUFACTURER  
OF CEMENTED CARBIDE MINING TOOLS**



LOOK TO

**P&H**

FOR ADDED VALUES

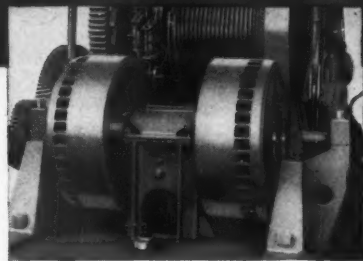


## THE SWING'S THE THING!

And here's the kind of swing that's sweet music to production men on steady digging. It's the Magnetorque on P&H 1055 that transmits power for swinging—without mechanical contact—without wear—without time lost for clutch adjustments—without the high cost of lining replacements.

There's nothing to compare with the P&H Magnetorque swing—with its smooth, velvety action—with its simple construction.

If you haven't seen the 1055 in action, write us. We will gladly tell you where the nearest machine is located.



THE P&H MAGNETORQUE transmits power for swing electro-magnetically—replaces swing frictions—eliminates the maintenance and repair work that goes with them. The Magnetorque unit will last the life of the machine.

**P&H**

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**HARNISCHFEGGER**  
CORPORATION

CONCRETE ELECTRIC CRANES AND HOISTS PORTS ROADS RAILROADS MINES

Stronger than oak  
lighter than steel..  
**Alcoa Aluminum Roof Beams**  
cut timbering costs and accidents  
at your working faces



Timbermen like the light weight of Alcoa Aluminum Roof Beams... a 4-inch H-beam in aluminum weighs only 4.85 pounds per foot. Alcoa Aluminum Beams at the working faces are easy to handle.

Miners like the higher headroom that's possible when your mine uses Alcoa Aluminum Roof Beams. Two or more inches in the clear can be added to working heights. Miners also like the safety of working beneath aluminum beams. And, aluminum is reliable... is impervious to fungus, resists the acids in mine water, requires no painting or protection.

You'll like the way Alcoa Aluminum Roof Beams cut down your operating costs. They can be used repeatedly, require no maintenance, can be safely stored underground, are fireproof. Ask your mine supply house for Alcoa Aluminum Roof Beams, or write to ALUMINUM COMPANY OF AMERICA, 1478 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in 54 leading cities.

**ALCOA** FIRST IN  
**ALUMINUM**



# Announcing a 25% INCREASE IN CAPACITY RATINGS of TIMKEN® bearings

**MAKES POSSIBLE THE USE OF SMALLER BEARINGS, WITH SAVINGS IN SPACE, MATERIALS AND COST — A RESULT OF YEARS OF CONSTANT IMPROVEMENT IN TIMKEN BEARING QUALITY**

**I**N the ten years since the present load capacity ratings of Timken tapered roller bearings were established, Timken bearings have been steadily improved. Improved so much that today the load carrying capacity of Timken bearings is a good 25% greater than it was 10 years ago!

As a result, The Timken Roller Bearing Company is now able to announce a 25% increase in the load capacity ratings of all Timken bearings—following a careful review of laboratory studies on fatigue life machines over the past ten years, together with close observation of bearing performance in the field.

#### **Permits Use of Smaller Bearings**

Now you can safely carry your present bearing loads on smaller size Timken bearings. Reductions in size of shafts and housings are possible. Products can be made more compact—lighter in weight. You have an opportunity to save both on bearing costs and material costs. And this increase in ratings should enable engineers to utilize the advantages of Timken bearings in an even broader variety of applications than has been practicable in the past.

#### **Result of Constant Quality Improvement**

This 25% increase in Timken bearing capacity ratings is based on continued

improvement in the quality of Timken tapered roller bearings over the past 10 years. It is due to a number of factors, including improved alloy steels made in our own Timken steel mill specifically for anti-friction bearings, better metallurgical control in the processing of this steel, more accurate manufacturing equipment, greatly improved surface finishes, and more accurate inspection methods. That these improvements in Timken bearing quality have resulted in 25% greater load capacity has been conclusively demonstrated by years of exhaustive laboratory and field studies!

#### **New Engineering Journal to Give Facts**

A new Timken Engineering Journal is now in preparation which will give

complete capacity rating tabulations and will also include new bearings introduced since the last publication. Pending publication of the new Journal you may take full advantage of the 25% capacity increase by multiplying the existing ratings by 1.25.

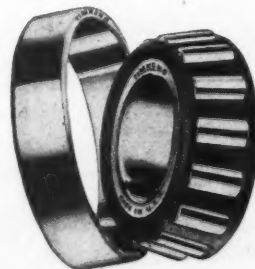
For further assistance in the application of Timken bearings, call upon our field engineers or our Engineering Department.

Timken tapered roller bearings take any combination of radial and thrust loads, hold shafts in rigid alignment, assure precision and minimize friction. The 25% increase in load capacity ratings is the latest example of Timken leadership in serving the bearing needs of all industry... one more reason why it pays to look for the trade-mark "Timken" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

## TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

### TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER □ THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST ——— LOADS OR ANY COMBINATION



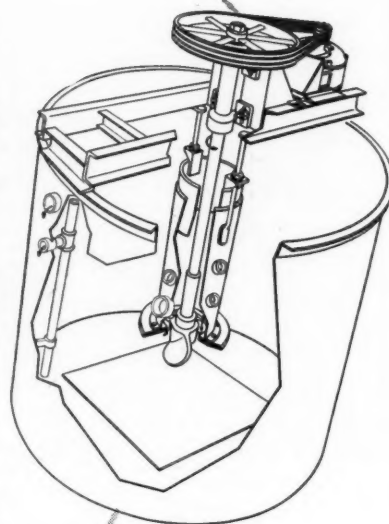


- For Better*
- AGITATING
  - CONDITIONING
  - AERATING
  - MIXING

*Use the* **DENVER**  
**SUPER-AGITATOR AND CONDITIONER★**

**High Specific Gravity Pulps Efficiently Handled**

Designed in a complete range of capacities for use in metallurgical, chemical and process industries, the Denver Super-Agitator and Conditioner will agitate, condition, aerate or mix any combination of liquids, or liquids and solids, which will flow through a 10-mesh screen. The machine is particularly suited to difficult problems involving pulps of high density or those containing high specific gravity solids. For use in acid circuits, corrosion resistant materials are available.



**★ PATENTED FEATURES GIVE EFFICIENT OPERATION AT LOWER COST**

**Positive Feed Eliminates Short Circuiting**

All feed enters the patented standpipe where it is drawn directly down into the propeller zone. Recirculation is through selectively adjustable openings on sides and top of standpipe. This positive and controllable flow eliminates all possibility of pulp short circuiting.

**Adjustable Weir Gives Controlled Aeration**

Addition of air into the pulp is controlled by the adjustable weir collar. Thus the adjustable depth of the swirling vortex of pulp draws the desired quantity of air through the propeller zone and into the material. Supercharging or the use of gas can also be easily adapted to this standard Denver Machine.

**Wearing Plate Reduces Propeller Load and H.P.**

The patented wearing plate at the standpipe bottom prevents overcrowding the propeller, thus reducing horsepower required. The same hood wearing plate prevents sanding in of propeller so that the machine can be quickly put back into service after shutdown.

*Write for* 16-page bulletin A2-B2 which describes in detail these and other operating advantages of the Denver (Patented) Super-Agitator and Conditioner and other agitating mechanisms. We can make good delivery on these standard Denver machines.



*"The firm that makes its friends happier, healthier and wealthier"*

**DENVER EQUIPMENT COMPANY**  
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**men who  
know the ropes**

**take  
Tiger Brand  
every time!**

**M**ADE to close tolerances and unvarying quality standards by the world's largest manufacturer of wire rope, U-S-S American TIGER BRAND Excellay Wire Rope possesses strength, toughness and flexibility in the right combination to stand up tirelessly under long, hard service.

It is easy to handle . . . can be speedily installed. It requires shorter breaking-in period . . . has less tendency to loop, kink or whip and it hugs sheaves and drums at all speeds. And its Excellay Preformed construction offers the highest resistance to bending fatigue.

You can depend on TIGER BRAND to help reduce maintenance and line replacement costs . . . to help you do a more efficient job in any operation calling for quality wire rope. That's why the Big Demand is for TIGER BRAND. See or call your supplier today.

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**UNITED STATES STEEL**



**EXCELLAY PREFORMED**

**THE BIG DEMAND IS FOR TIGER BRAND**



# Industry is on the Move .... Westward

UNION PACIFIC RAILROAD COMPANY  
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PRESIDENT

To American Industry:

The Union Pacific West offers industry proximity to products of ranch, mine and forest...ample power, fuel, water...healthful living conditions in scenic, recreational regions...and native-born, high-type labor.

Our faith in the future of this vast territory is confirmed by our current 200-million-dollar investment program for new equipment, improved and expanded facilities to provide shippers and travelers with the utmost in rail transportation.

We are at your service.

Yours very truly,

President,  
Union Pacific Railroad



George F. Ashby

\* One of a series of advertisements based on industrial opportunities in the states served by Union Pacific Railroad.

Unite with Union Pacific in selecting sites and seeking new markets in California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington, Wyoming.

\*Address Industrial Department, Union Pacific Railroad  
Omaha 2, Nebraska

## UNION PACIFIC RAILROAD

*Road of the Daily Streamliners*

# Core Drill your Properties WITH PIONEER STRAITLINES

- Prove up mineral values.
- Test for quality and depth of coal measures.
- Data secured will aid in planning production either by underground mining or by stripping.

**PIONEERS MEET THE REQUIREMENTS OF YOUR JOB.** You'll find the Pioneer Straitline easy to move because of light weight and frame mounting. Quickly set up for operation, test holes can be rapidly drilled all over your property. In mineral exploration you can drill to 600' recovering  $\frac{7}{8}$ " core. Or if  $1\frac{1}{8}$ " core is required, the capacity is 500'. When drilling coal measures, better coring results will be obtained with  $2\frac{1}{8}$ " core. Your Pioneer will recover this size to a depth of 300'.

**PLENTY OF POWER.** The Pioneer is driven by a 10 h.p. water-cooled gasoline motor. The power is transmitted either to the drill head, or to the hoist through a sturdy clutch, and a 3-speed transmission. The built-in drum hoist will pick up the rod load smoothly. Hoisting speeds from 70 to 225 f.p.m. are available. Air or electric motors furnished if required.



**HYDRAULIC TYPE DRILLING HEAD.** The Longyear hydraulic swivel or drilling head gives the operator a sensitive and instantaneous control of bit advance. This is important in drilling areas of alternating hard and soft rock, or in penetrating seams of coal. The hydraulic head is operated by means of circulating oil supplied by a built-in oil pump. A screw feed swivel head can be supplied if preferred.

**USERS OF THE PIONEER IN BOTH THE HARD ROCK AND COAL FIELDS REPORT TOP PERFORMANCE. YOU WILL FIND IT WELL ADAPTED FOR YOUR JOB. WRITE FOR BULLETIN J-69.**

## E. J. LONGYEAR COMPANY

MINNEAPOLIS, MINNESOTA, U.S.A.

NEW YORK OFFICE, 1775 BROADWAY

**CANADIAN LONGYEAR, LIMITED, NORTH BAY, ONTARIO, CANADA**

**DIAMOND CORE DRILLS • CONTRACT CORE DRILLING  
SHAFT SINKING • GEOLOGICAL INVESTIGATIONS**

REPRESENTATIVES IN PRINCIPAL MINING CENTERS IN THE UNITED STATES AND OTHER COUNTRIES



Sumping



Along the face

The finished cut

**GOODMAN MANUFACTURING COMPANY**  
 HALSTED STREET AT 48TH • CHICAGO 9, ILLINOIS



# SHOVELING DAYS ARE OVER

**When the Goodman Bugduster  
Is Put to Work**



- A dust hazard is eliminated.
- The kerf is left clean.
- Cuttings are piled in a single row back from the face and away from the direction of cutting.

**The Bugduster Can Be Installed On  
Any Goodman Type 512 Shortwall**



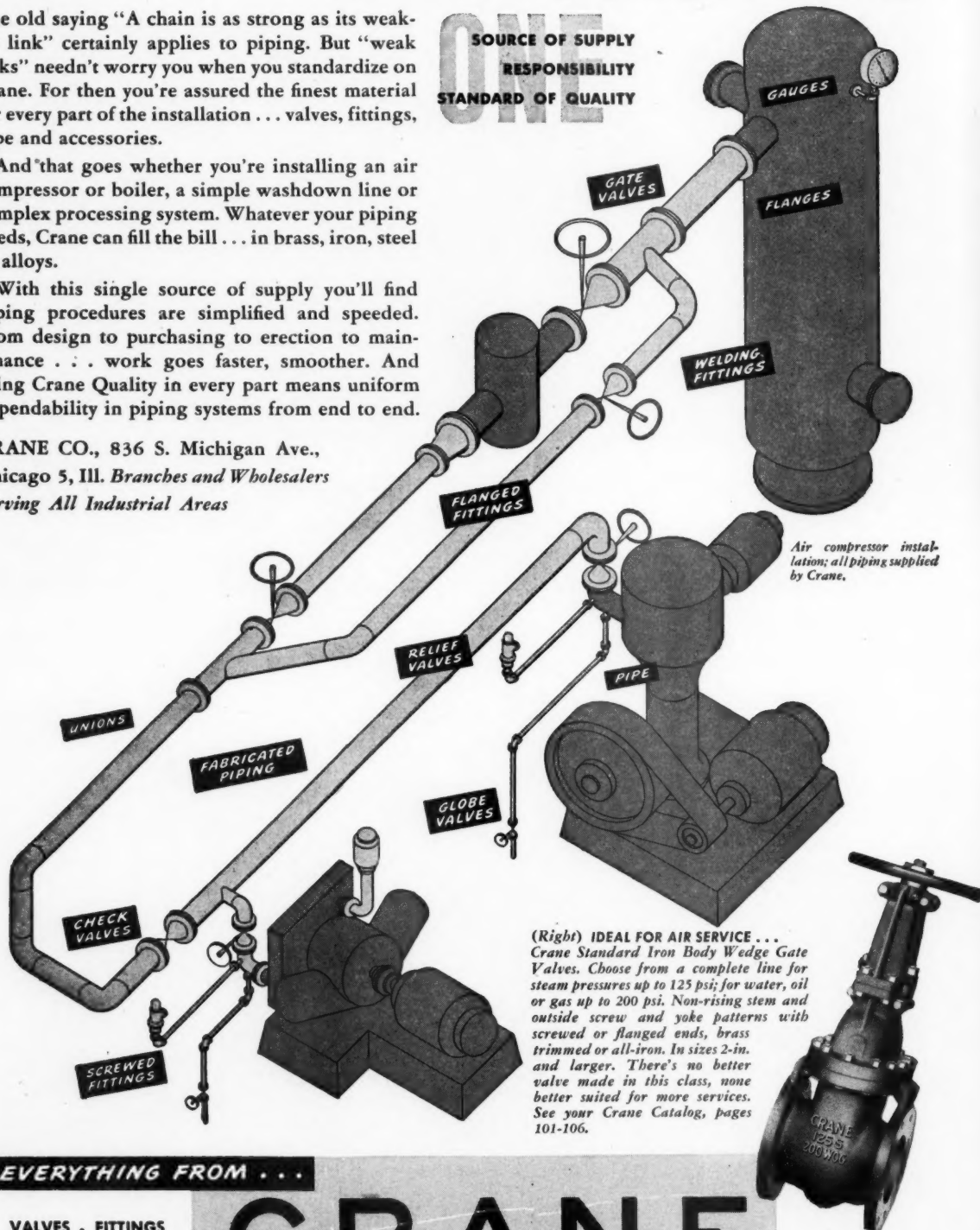
# No worry about "weak links" when all piping is Crane

The old saying "A chain is as strong as its weakest link" certainly applies to piping. But "weak links" needn't worry you when you standardize on Crane. For then you're assured the finest material for every part of the installation . . . valves, fittings, pipe and accessories.

And that goes whether you're installing an air compressor or boiler, a simple washdown line or complex processing system. Whatever your piping needs, Crane can fill the bill . . . in brass, iron, steel or alloys.

With this single source of supply you'll find piping procedures are simplified and speeded. From design to purchasing to erection to maintenance . . . work goes faster, smoother. And using Crane Quality in every part means uniform dependability in piping systems from end to end.

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Chicago 5, Ill. *Branches and Wholesalers*  
*Serving All Industrial Areas*



*Air compressor installation; all piping supplied by Crane.*

(Right) IDEAL FOR AIR SERVICE . . . Crane Standard Iron Body Wedge Gate Valves. Choose from a complete line for steam pressures up to 125 psi; for water, oil or gas up to 200 psi. Non-rising stem and outside screw and yoke patterns with screwed or flanged ends, brass trimmed or all-iron. In sizes 2-in. and larger. There's no better valve made in this class, none better suited for more services. See your Crane Catalog, pages 101-106.

EVERYTHING FROM . . .

VALVES • FITTINGS  
PIPE • PLUMBING  
AND HEATING

# CRANE

FOR EVERY PIPING SYSTEM

# Power! Traction! Speed!



The new Allis-Chalmers HD-19 and Baker Bulldozer are setting remarkable records for low cost yardage on the toughest jobs in the nation.

With over 24 tons of fighting weight, this powerful bulldozing team provides speed, power and traction never before available.

ABOVE: Engine Mounted Hydraulic Bulldozer for HD-19  
BELOW: Engine Mounted Cable Bulldozer for HD-19

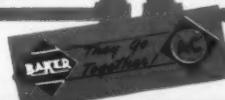


Baker Bulldozers and Gradebuilders were designed from the blueprint stage up, to harness the terrific power of the HD-19. As a result you get every ounce of power at the blade — positive all weather traction for tough going — blade operating speeds that conform to travel speeds — fast, easy operating controls — good visibility, and a complete package of power, versatility and operating economy.

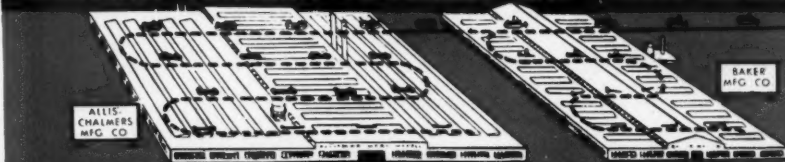
Before you start your next job — get started right. Send for literature today on the Baker Cable or Hydraulic Bulldozer and Gradebuilder.

**BAKER MFG. CO., SPRINGFIELD, ILL.**

# BAKER



## "STRAIGHT THROUGH" ASSEMBLY LINE - ALLIS-CHALMERS TO BAKER TO YOU!



The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops, adjoins the Allis-Chalmers crawler tractor plant.

When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.





# THESE DU PONT PRODUCTS FOR COAL MINING

*Promote Economical and  
Efficient Operations*



"MONOBEL" AA —an excellent producer of big lump coal. Has a slow, strong, heaving action. Splendid water-resisting qualities. Today's largest-selling permissible.



"LUMP COAL" C —also has a slow, heaving action that moves coal away from the face. A very popular permissible.



"GELOBEL" C—a gelatinous permissible of high velocity. Highly water-resistant. Ideal for rock work and where the going is extremely wet.



DU PONT ELECTRIC BLASTING CAPS —widely used and widely famed for their dependability. Three exclusive features make both instantaneous and delay caps safer: brightly colored nylon-insulated leg wires, highly water-resistant rubber plug closures, aluminum foil shielded shunts.

In today's coal mining operations, efficiency, economy and dependability are more important than ever before. That is why Du Pont permissibles and Electric Blasting Caps are so widely used.

Mine superintendents, foremen and powdermen in anthracite and bituminous mines throughout the country heartily endorse these well-known products. Ask the Du Pont Explosives representative in your district for complete information about these and other Du Pont permissibles and blasting accessories.

**E. I. DU PONT DE NEMOURS & CO. (INC.)**  
Explosives Department  
Wilmington 98, Delaware

## DU PONT EXPLOSIVES

*Blasting Supplies and Accessories*



REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING  
... THROUGH CHEMISTRY



It **CAN'T**  
"Nose Dive"!

### **Gardner-Denver R94 Stoper**

Close quarters? Precarious footing? Your runners are safer with the new Gardner-Denver R94 self-rotating Stoper. Held in any position, it will not "nose dive." The R94 is 100 pounds of *perfect balance*. Its holding handle is in the correct position . . . weight is accurately distributed. A fine balance is maintained between drilling speed and the power of feed at all pressures.

Why not get the complete R94 story before you buy? A field engineer will gladly demonstrate this high-speed stopper. Or, write to Gardner-Denver Company, Quincy, Illinois.

**High drilling speed**—same valve construction as in R104 gives comparable drilling speed.

**Improved holding handle control**—Air is regulated to the feed leg by a simple turn of the wrist.

**Powerful rotation**—4-pawl, with reversible pawls for long life. Finger-tip control stop rotation available.

**Complete protection of working parts**—Whether throttle is on or off, an automatic system of cleaning air protects the drill against entrance of sludge and water.

**Integral lubrication**—integral lubricator is embodied in the cylinder.



## **GARDNER-DENVER**

SINCE 1859



#### Another Recently Developed Fine Feature of S-D "AUTOMATICS"

We have now eliminated the latch lever bar that we formerly used across the rear end of the car. This latch lever projected past the side walls of the car, with the result that when the cars were derailed or met obstructions in the mine, the latch lever bars were often bent and had to be straightened before the doors could be unlatched. Furthermore, in our old design we used only one latch hook.

In our improved and patented method of releasing the doors for dropping, we have two latch hooks and the doors are unlatched automatically from underneath the car by tripping devices that engage the latch hooks directly and push them back as the car moves forward. Therefore, the rear end of the mine car today looks like the front end; namely, there is no latch lever mechanism upon it.

The coal company that first used the S-D "AUTOMATICS" has installed the new type of unlatching, and the president of the company told us it was one of the greatest improvements made in bottom-dumping mine cars since the original patents were issued.

#### "AUTOMATICS" Are Made Any Capacity Whatsoever

S-D "AUTOMATICS" have been made already to carry more than 40 tons. We are making an 8-wheel S-D

"AUTOMATIC" car to go inside mines, or for strip mining either, which is 37 ft. over-all and 4 ft. 8 ins. high, and which will hold approximately 27 tons of coal. The general principles of operation are the same whether the car holds one ton or 40 tons. None of the cars are racked or twisted by being turned over endwise, or by being tilted on end. Some of the largest cars are now being equipped with Westinghouse air-brakes.

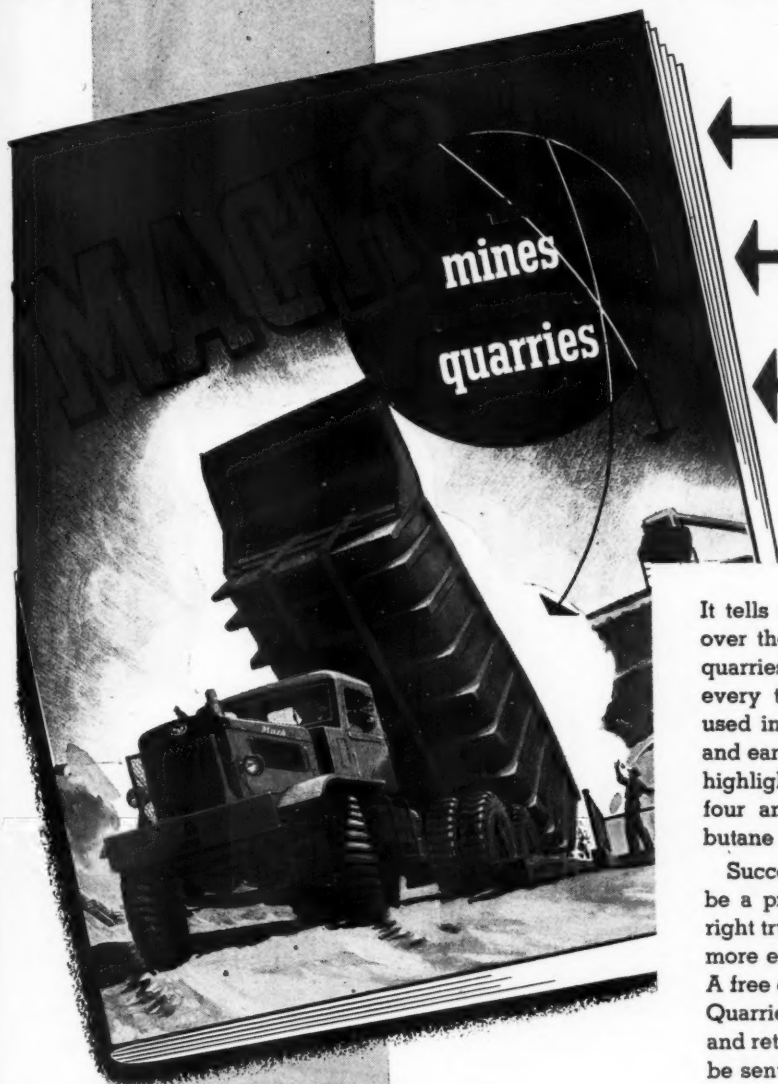
#### Leasing of "AUTOMATICS" Is Getting More and More Popular

Today we have more orders for cars on our books that are to be leased to the customer than we have ever had in our history. This method of equipping the mine with "AUTOMATICS" has been found to be very desirable from the standpoint of the user. Throughout an average period of 15 years, the cost of leasing the cars has averaged less than 2c a ton for the quantity of coal handled in the car. Moreover, you can, if you wish, end the lease contract by purchasing the cars at a reduced price. Let us go over the terms of our lease with you and explain it to you so you will clearly understand its advantages. When you lease cars from us, you make no cash investment in the cars themselves, and very little for the bin equipment. Bins are necessary if the cars are to be used to the best advantage. If you want one of our representatives to call on you, drop us a line. If your mine is where our representatives do not travel, write us a letter, or send us a telegram, or call us up over the long distance telephone.

*20 Car loads of "Automatics" from -*

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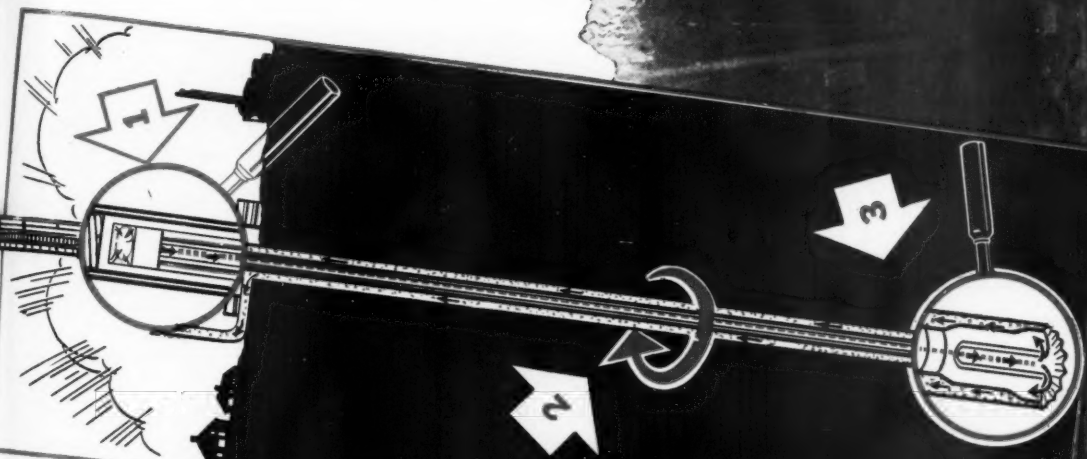
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by The American Mining Congress

SHELDON P. WIMPFEN, Editor

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## GOLD! GOLD! GOLD!

WITH the dawn of 1848, when gold was discovered in California, a new era was dramatically opened in the development of the United States. Today the cry of *gold* has another significance. The realization is growing that money, as a measure of value, a medium of exchange, and a convenient method of storing wealth, must have more than a mere technical relationship to a universally accepted medium—gold.

Sound money is the essential ingredient of a sound economy. On a foundation of sound money, with a currency freely exchangeable with gold and bearing a fixed relationship to silver, this country grew and provided for its people in an unequalled manner. Legislation has not and cannot effectively abolish universal acceptance of treasured metals; thus we may safely venture the statement that gold would supply its bearer with a nearly equal amount of goods and services in any market of the world—a feat few paper currencies can equal.

Fourteen years have elapsed since the prohibition on ownership of monetary gold went into effect; hence, if we use the usual estimate of 25 years as the average life of a business generation, more than half of the present generation has had little or no personal experience with gold coin. Along with the right to possess gold went the power of the people to express faith or distrust in the Government's promises to pay, as demonstrated by their willingness to accept paper in lieu of gold. The security and protection afforded by the ownership of gold have been wiped out. If we are again to have a monetary standard with the strength and power to resist manipulation, free currency-gold exchange must be reestablished.

Growing concern about gold is warranted and many sound minds are pondering a solution to the world's monetary headaches. In an open letter to the chairmen of the Senate and House Committees on Banking and Currency, Francis H. Brownell, chairman of the finance committee of the American Smelting and Refining Co., showed that the two billion dollar increase in U. S. gold holdings, that accrued in 1947, was caused by dollar demand linked to compliance with the \$35 per oz price level on gold requested by the International Monetary Fund.

Mr. Brownell points out that our possession of 60 per cent of the world's gold, excluding Russia's, makes it difficult for other nations to return to some

form of a gold standard. If our gold purchase rate should continue, in about ten years the United States would possess all the monetary gold in the world, outside Russia. As a means of halting inflationary trends and enabling partial satisfaction of the demand for gold, Mr. Brownell proposes amendment of United States laws to: rescind the prohibition of ownership of gold by United States citizens; permit a free market, both in the United States and elsewhere, for all gold, including United States mine production; and leave the present gold policy otherwise unchanged, continuing the obligation of the Treasury to buy gold offered at \$35 per oz. He adds that private demand will most likely absorb all newly-mined gold offered for sale.

If gold could be legally possessed by the people, a large quantity of it—the amount is anybody's guess—would go into hoarding and thereby withdraw from circulation an equal amount of currency. Such a withdrawal of circulating money would presumably have a tendency to cause a decline in commodity prices as fewer dollars would be competing for available goods.

In discussing gold in the February issue of *MINING CONGRESS JOURNAL*, Donald H. McLaughlin advocates a free market for gold. This action would permit gold to seek its own level in terms of paper currency and, according to Dr. McLaughlin, "... the new price would merely be recognition of the degree of inflation (or depreciation) of the paper dollar that has already taken place." He goes on to say that a higher price of gold would no more influence domestic prices in dollars than did the increase effected in 1934. But he adds that "it would be an admission of the weakness of the dollar and of the present degree of inflation, and this probably is too much to expect the Government, the Treasury, or the dominant banking authorities to face."

One of the Treasury's principal objections to the January 1939 proposal of the American Mining Congress to permit recirculation of gold coins was the possibility that another change in the gold price would repeat the difficulties of 1933-1934 when all outstanding gold coins and certificates were called in. Dr. McLaughlin's proposal to mint 1-oz pieces of gold, appropriately named, but bearing no dollar equivalent value, obviates this objection. These 1-oz pieces could circulate at the legal rate of \$35 and if at some future date a price change might be effected—as is considered inevitable in some quarters—the withdrawal of gold from circulation would not be required.

This plan would tend to halt the declining purchasing power of the dollar, for, openly backed by gold, dollars would again be worth saving. Confidence in the Government would be restored with the right of the people to invest in the form of wealth they know to be secure. The growing possibility of a completely managed currency, with its related evil of a managed economy, would be substantially diminished. Stabilization of our own currency would point the way for other countries to revert to a monetary standard held in respect and confidence for thousands of years. Foreign exchange could be stabilized on a gold basis. Although the proponents of managed currencies persistently proclaim otherwise, gold is more valuable than an inconvertible promise.





Since 1931 the United States Potash Co. has been mining sylvinite ore at Carlsbad, N. M.

# Development of the Domestic Potash Industry

**P**OTASH, principally the product of the refining of sylvinite ore—a physical combination of halite, or common salt and sylvite, or potassium salt—is produced in the United States by five large companies, and is a by-product of several chemical manufacturers. Over 80 per cent of the potash of the United States, indeed of the whole Western Hemisphere, is the product of mines in the Permian Salt Basin of the Pecos Valley in New Mexico, about 175 miles from El Paso.

For the most part the mines are in Federal land leased for 20 years under an Act of Congress passed and approved in 1927. Some mining is done on New Mexico state land, and small tracts are owned by potash companies.

Discovery of potash is the result of drilling under Federal prospecting permits. When a commercial body of potash is proven by adequate core

**A Former "Have Not" Mineral in Which the United States Has Attained Self-Sufficiency—Future Development Threatened by Restrictive Land Policies**

By **HORACE M. ALBRIGHT**

President  
U. S. Potash Co.

drilling tests, not more than six leases, embracing not more than 15,360 acres of land may be granted by the Secretary of the Interior to one individual or company. The leases are for 20 yr with the right of renewals for 10-yr periods.

In other words, potash is a mineral subject to the leasing laws, and not to the old lode and placer mining laws.

Prospecting permits are issued by the old General Land Office, now the Bureau of Land Management. Leases originate in the Bureau of Land Management and are approved by the Secretary of the Interior. Administration of the leases is entrusted to the Mineral Leasing Division of the United States Geological Survey. Mine safety activities are under the supervision of



the Bureau of Mines. The Bureau and the Survey also cooperate with industry in research, economic studies, mapping and other important fields of activity.

These two agencies are outstanding in the Federal Government because of the high character and technical qualifications of their personnel, the standards of professional excellence in their scientific research, the traditions of thorough and painstaking exploration for new resources, and the publication of their surveys and maps for the guidance of both Government and industry. The Bureau of Land Management likewise has exceptionally able chiefs whose fair and impartial handling of mineral cases for decades has profoundly influenced the development of our natural resources.

With a sound workable mineral-leasing statute, administered by able chiefs and technicians of these old and respected Bureaus of the Interior Department, what could a mineral lessee, a potash lessee, have to worry about? Why should he not be moving forward on a track with all the green lights beaming at him? These questions pose our problem. First, a "cut-back," as the movie makers call it, to the days when we were a "have-not" nation as to potash.

Some 80 years ago the Germans discovered that potassium or potash is a vital plant food, that crops gradually remove this important mineral from the soil, and that it has to be replaced to give body and strength to vegetation, to increase the volume of the harvest and otherwise benefit agriculture. Of course, potassium has been an important industrial and medicinal chemical for centuries. Potash makers were brought to America among the first settlers.

In Germany, sylvinites and other potash salts were found in abundance in Permian deposits at varying depths in several regions, notably Hanover and Thuringia. Later the Germans found potash in Alsace but lost the ore bodies to France after World War I.

Beginning a half century ago, the United States imported potash in large quantities for fertilizers and industrial uses. After a miserable experience in 1910 with the Germans, when contracts with Americans were canceled involving enormous losses, and penalizing taxes were imposed on exports to the United States, our Government directed the Geological Survey to search for a domestic supply of potash. None was found prior to the opening of World War I except at Searles Lake, Calif., where there were some encouraging results in obtaining potash from the brines found there.

With Germany blockaded and all imports cut off, the United States was suffering from a shortage of potash for agriculture and many chemical requirements. During the war, 128

plants were built to extract potash from brines, sands, seaweed and certain complex minerals such as the alunite of Utah, but in 1918 production reached only 54,803 tons which sold for upwards of \$500 per ton. During World War II potash was supplied at approximately \$23 per ton.

When World War I ended, German and French potash was again imported and all domestic operations with the exception of the Searles Lake plant went out of business.

### Exploration Reveals Ore Bodies

Determined not to be caught again without adequate supplies of potash and resolved never again to be a "have-not" nation with regard to this essential mineral, Congress authorized appropriations of \$500,000 for exploration by core drilling to find, if possible, one or more bodies of potash salts that could be mined and refined on a large scale. In New Mexico 13 holes were drilled, 10 were drilled in Texas, and one was put down in Utah. In the meantime, studies were made of cuttings from oil wells, and in 1925

eral and state lands held under leases, or in small tracts of fee-owned property.

American production of potash in 1931, when the first New Mexico mine was put into operation, was 63,880 tons of  $K_2O$ . Production approximated 1,000,000 tons of  $K_2O$  in 1947. In the United States alone 255,350 tons of  $K_2O$  were sold in 1931. During 1947 domestic sales exceeded 800,000 tons of  $K_2O$ . Canada, Cuba, and a few other nations of North, Central, and South America used the remaining available tonnage. But the United States could have used it all as the demand for potash as fertilizer has grown tremendously during and since the war.

### Investigations Harass the Industry

During the development years, 1926 to 1940, America achieved independence from foreign producers and foreign cartels and became a "have nation" so far as the important mineral potash was concerned. This was due to private enterprise expending its own money and with the admin-

Aggressive action took potash from the "scarce list" of domestic minerals some 20 years ago. After private industry demonstrated its ability to provide ample supplies, Government restrictions and investigations harassed producers. If further difficulties in the potash industry are to be avoided, Government regulation must be curtailed.

sylvite was identified in samples from Texas, Utah and New Mexico. The cuttings from New Mexico came from a well drilled by Snowden and McSweeney, independent oil operators. That company's stockholders, as a prospecting group, then drilled the first core test for potash beginning April 14, 1926, just before the Federal appropriations were made available. The Snowden and McSweeney group, by large expenditures of money in the drilling of many core tests, discovered a commercial body of ore in the Permian basin of New Mexico near Carlsbad. They organized what is now the United States Potash Co. and by January 1931 had completed a shaft and were producing potash ore suitable in itself for certain uses as fertilizer. By September 1932, the United States Potash Co. had a refinery in operation.

The Potash Co. of America, organized in 1936 by a Denver group, began production from a mine several miles north of the first shaft of the pioneer company. A few years later the plants of the International Minerals & Chemicals Corp., also in New Mexico, were in production. It is from these three mines and their associated refineries that over 80 per cent of all potash originating in the Western Hemisphere is produced. All ore is in Fed-

erative and technical advice of the Bureau of Land Management, the Geological Survey and the Bureau of Mines. The potash industry had no tariff protection, no Government financial support of any kind; in fact, no aid of any kind except the sympathetic interest of the experts who were charged with finding potash for America.

Men in the Government bureaus directly concerned with exploration for and development of potash ore bodies were proud of the establishment of this great new industry. Men like H. I. Smith, the head of the Geological Survey's Mineral Division, wrote extensively on the subject, accurately reporting the growth of this mining enterprise so vital to American agriculture and the chemical industry.

But others in the Interior Department strongly committed to public ownership of electric power, bent on more controls, suspicious, jealous, and uninformed, instituted "studies" of the industry, investigated its every move, and, from NRA days to World War II consumed much time and energy of company officials in assembling data, attending conferences, and interviewing new and uninformed people who projected themselves into the potash picture.

At first the inquiries were based

on assumptions that previous administrations had illegally or unwisely issued permits and leases or had favored certain groups. When these assumptions were exploded by analyses of the records showing clean, fair, impartial decisions, and strictly legal procedure, the industry was deemed worthy of constructive consideration and this took the form of withdrawal of authority to issue prospecting permits. This was probably a sound move at the time in view of the necessity for the new industry to get soundly established. However, this action stopped all exploration for potash for nearly 10 years, for neither operating companies nor prospectors could obtain permits to drill in search of new ore bodies.

Next came a Senate investigation in 1936 that continued intermittently for four years. All Senators who visited the potash mines and the brine plants at Searles Lake, Calif., were pleased with developments and expressed admiration at the courage, enterprise, and technical skill that had gone into their development.

Early in 1939, the Department of Justice began a study of the industry and at mid-year the Department of Commerce joined the investigation with a staff of experts to examine potash operations from all angles. These studies were thorough and the results must be regarded as beneficial although enormous expenditures of money, time and energy went into assembling the data and attending conferences. There were no prosecutions of the potash producers and the economic report completed early in 1940 is a fine business study. It ends with this tribute to the builders of the industry:

"... this study has not revealed any circumstances which establish the proposition that the laws have been violated. On the contrary, it appears that the potash industry has demonstrated clearly those factors of pioneering development, technological advance, and responsible management which represent the highest expression of American industry."

It is obvious that, from 1934 to 1940, the potash industry grew in a goldfish bowl, and because of the essential importance of its products, the industry remains under constant surveillance.

This new American industry grew so fast and became so great that by 1935 it ran head-on into European competition, including that of newly-opened Russian and Spanish mines. American potash producers had to resort to selling in foreign trade to move potash output, and two companies exported substantial quantities to Japan.

When the great war broke out in 1939, in agreement with Department of Commerce officials, the American producers canceled contracts for export and suspended the operations of

its newly-created Export Association, because it was obvious that European potash would be shut out of our markets. But nothing was done by the Government to prevent the export of potash. Hence, in 1940 some 56,000 tons of  $K_2O$  went to foreign countries and over half of this to Japan. These exports were at high prices realized by brokers and other shippers, while the potash producers here tried to meet the demands of the domestic users. In 1941 export controls were established, and that year only run-of-mine ore below 27 per cent  $K_2O$  was available for export by anybody. Most of the material exported in 1941 went to Japan with full Government knowledge and approval.

Early in 1941, the predecessor of the War Production Board asked for voluntary cooperation in assuring high-grade muriate of potash for the chemical industry before commitment of production to the fertilizer manufacturers. This cooperation was extended at once by the two producers of chemical grade potash.

Next came complete control of all distribution of potash to both industry and agriculture by the War Production Board. The system of allotment adopted was a fair and equitable one and was wisely and efficiently administered by able executives. This system was in full force and effect until mid-1946 and, in reality, controlled potash distribution until April 1, 1947, since the allocations of 1946 affected deliveries for a 10-months' period.

During the war, that is between 1939 and 1946, the American potash industry tripled its production, spending millions of its own funds and receiving no Government aid except in priorities on materials for construction, and quick amortization on parts of new plants built to meet war requirements.

As the war drew to a close, the Government planners turned their attention to potash. A report was issued quite clearly urging a program of importation of potash from Europe to conserve American resources and even intimating that consideration should be given to suspension of American production as a conservation measure.

### Restrictions Bar Exploration

With exploration for new potash reserves stopped for 10 years by Government edict, there suddenly came the realization that exploration should be resumed. Official action was taken on Jan. 9, 1945, when the Interior Department issued new regulations regarding potash leasing. The provisions for the most part were a restatement of the old code of rules, but the new policy group inserted some new clauses. These were aimed directly at the companies that had discovered

and developed the potash of New Mexico and the brines at Searles Lake, and that had provided potash for America and many of her allies all through the war entirely without cost to the Government and at prices prevailing in 1937.

Existing companies having the maximum of six leases were prohibited from having permits to explore other lands in search of potash. Furthermore, in all new leases to be issued in the future a provision was to be inserted under which the Secretary of the Interior could commandeer up to 25 per cent of a lessee's output at a wholesale price to be determined by him on giving a year's notice of his intentions.

Obviously, these policies were extremely restrictive, and were the outcome of thinking that the Department, with its leasing powers, could and should determine the size of a lessee's operations, the extent of his explorations, and by taking a substantial part in his production, control a market, making or breaking prices, not to mention destroying customer relations. The leasing law gave no authority for these new rules. Nothing in hearings before committees or in debate on the floor of Congress supported the action taken. Of course, the new rules brought no prospectors into the field. In fact, few, if any, permits were issued for potash search.

After two years of conferences and a hearing in Albuquerque in September 1946, the regulations were amended on March 24, 1947. Now a company, even the present producers of potash, can have prospecting rights on 40,000 acres or 25,000 acres in addition to the land they may have under lease, and the Secretary can only commandeer 10 per cent of their output. Producers contend that these restrictions as to exploration and Government purchase of 10 per cent of a lessee's output are illegal or at least extra-legal. In addition they think the old rules based strictly on the leasing act authority should be restored.

### Proposed Congressional Action Could Destroy Private Industry

Senate Bill 1251, in Title IV, would authorize the Department of the Interior to declare potash and phosphate lands to be public trusts, and if any part of a lessee's lands should be covered by one of these trust orders, the Secretary could refuse to renew a lease as provided by the Potash Leasing Act. Also the Secretary would be authorized to commandeer any part of a lessee's output, short of all of it. This is a bill to put the Government in the business of potash and phosphate mining and refining and in the manufacture of fertilizers. It must be defeated.

With minor reforms of one kind or another, more than a little Government ownership has been imposed. These restrictions first stopped potash exploration, then later permitted exploration with serious restrictions. This curbing of exploration was apparently based on fears that successful lessees might grow into larger organizations. Yet the Government should have been proud of its lessees' outstanding performance in supplying sorely-needed potash. The obvious and sensible action to have taken would have been to encourage exploration to enlarge potash reserves. Little wonder that mining industries generally have come to fear mineral leasing, and to demand adherence to the old mining laws permitting location of claims after discovery followed by patent.

Even if exploration had not been continued, potash would still have been among our more plentiful materials. Elmer W. Pehrson, of the Bureau of Mines, in the February 1944 issue, of *Mining and Metallurgy* and again in *Foreign Affairs* in July 1945, said that our commercial reserves of potash, using the 1935-39 average annual rate of use as a base, will last 117 yr, and that the order of magnitude of submarginal resources of potash is such that consumption on this 1935-39 base could not be exhausted in 500 yr.

In 1945, Samuel H. Dolbear made an independent survey of American potash resources and stated that "At

the annual rate of consumption and imports prevailing for the years 1935-39 the known developed reserves in present active operations would last for over 290 yr. Reserves other than those under production, including partly developed sources and strategic reserves which may be utilized in an emergency, provide a tonnage so large that exhaustion is not predictable within several hundred years."

Next, in December 1945, in the *American Magazine*, Secretary Ickes, in an article entitled "The War and Our Vanishing Resources," said, "If we are willing to pay the price for them, our potential reserves of iron ore, phosphate rock, molybdenum, potash and all forms of sulphur are ample for many years to come."

Lastly, Secretary Krug recently appeared before Senator Malone's National Resources Subcommittee of the Senate Committee on Public Lands and estimated that there is more than a 60-yr supply of potash at normal peacetime rates of consumption available in California and New Mexico.

What is the point in this potash story? Obviously, the United States Geological Survey and the Bureau of Mines under their expert leaders can and should be allowed to administer the leasing laws strictly as enacted by Congress. Now, when we want to be a "have" nation in all essential metals and minerals, is not the time to introduce reforms devised by legal and economic advisors who have had no experience with the heartbreaking



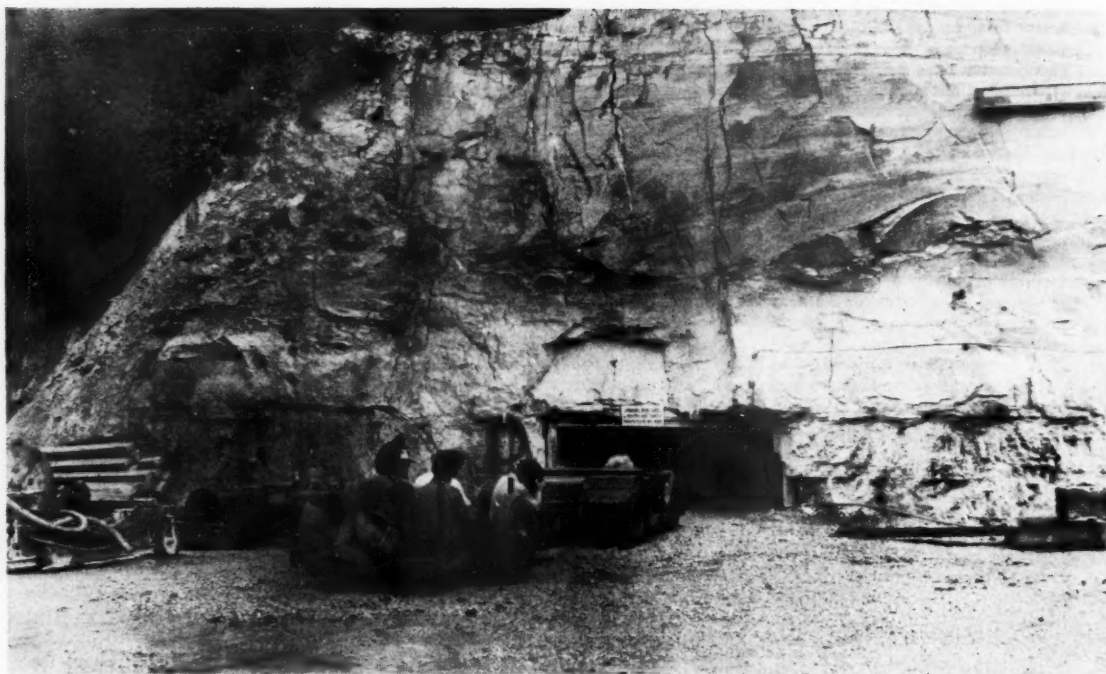
Potash ore moves to shaft on shaking conveyor.

hazards, hardships, and obstacles encountered in the mountains and deserts in finding and developing mines. Such men may have their place in the Department of Justice and in the Department of Commerce, too, but not in the policy making of the Department that is responsible for making this a "have" nation in mineral resources.



Refined potash from this plant and others in the Pecos Valley produce 80 percent of the domestic supply.





Men and supplies use this portal of the Wright mine.

# Outcrop Coal Mining

**A New Development by Consolidation Coal Company (Ky.) in the Elkhorn Field Is Designed to Reduce Operating Costs by the Elimination of Extensive Underground Workings**

By **GLENN B. SOUTHWARD**

Mechanization Engineer  
American Mining Congress

**P**RESSURE upon the industry to lower the high cost of producing coal is leading to many changes in conventional mining technique, and one of the newer developments is "outcrop mining"—a system which brings a large part of the mine to daylight. As this statement refers to deep and not to strip operations, it sounds like a contradiction, but outcrop mining is nevertheless a reality. And a profitable one. To explain briefly, it is a system that can be applied only to long and rather narrow areas of outcropping coal, which are of frequent occurrence in very hilly and mountainous country. In such a territory, the producing panels are the only workings carried on underground—everything else is outside; the main haulage is laid along the outcrop and room entries are turned off of this into the solid coal. Each room panel, which is of comparatively small area and designed for rapid extraction, is entirely inde-

pendent of all others. When one is mined to completion it is abandoned and crossed off the map with no further attention given to drainage, ventilation or other maintenance; even sealing is unnecessary.

## Imperative Need to Reduce Mining Costs

Although the basic idea of outcrop mining is not new, its development has introduced some new techniques, suggested by strip mining as practiced in the Appalachian Mountain region. Taking a leaf from the strip mining book, the main haulage road-bed is made by an open side-hill cut along the outcrop, overcasting the top dirt and loading the coal for the preparation plant. In this manner, a three-fold advantage is gained; the cost of moving the dirt is paid for by the coal, the cut is of sufficient width to accommodate all necessary trackage and finally, the seam is faced up

ready for easy and inexpensive drift portals.

Before presenting a detailed description of an outcrop mine which has recently gone into operation in southeastern Kentucky, it might be well to give a brief discussion of the factors which are responsible for this development. As everyone knows, the rising costs of labor and material are forcing the coal industry to take advantage of every possible means of cost saving, and the efforts are usually directed along three lines of endeavor: (1) to increase the productive rate of a machine; (2) to increase the productive time of a machine, and (3) to reduce the cost of the non-productive work by developing machines to replace hand labor—such as timbering machines, mobile drills, supply trucks, etc.

These efforts have resulted, and will continue to result, in increased operating efficiency and cost savings but they have been applied mainly



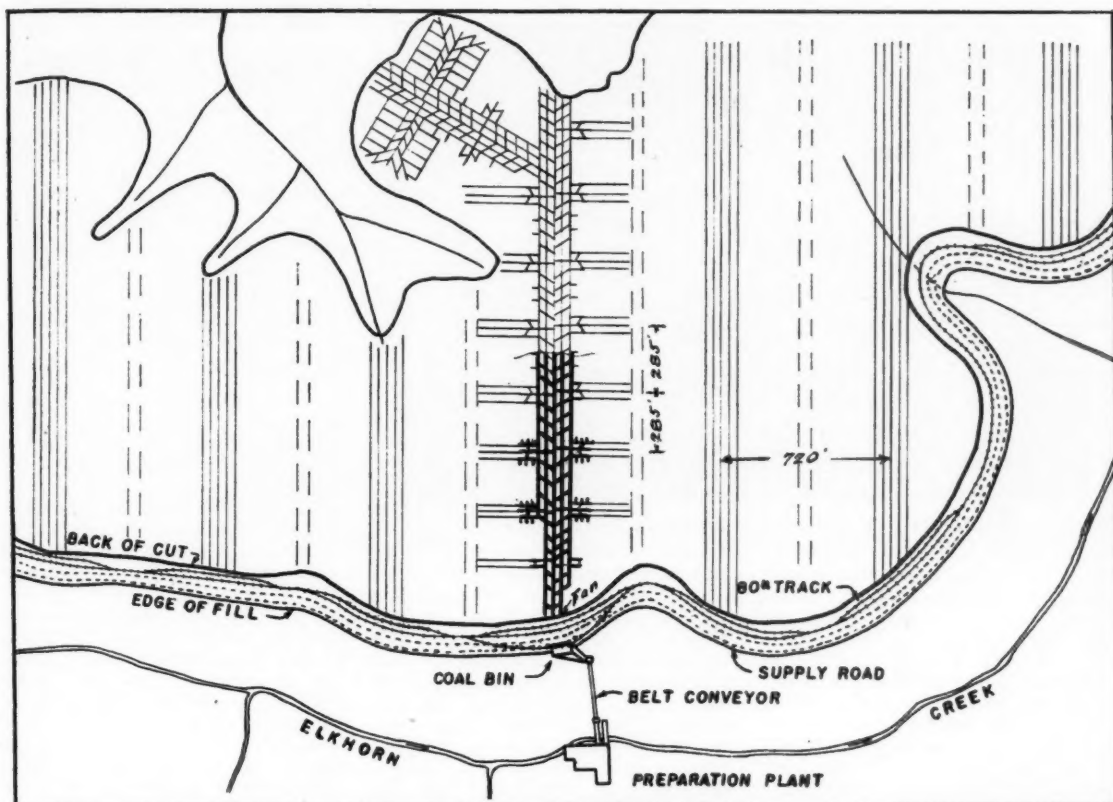


Fig. 1. Projection and present development of Wright Mine.

to the operations in the working panel because that is where most of the mining costs occur. But in a modern mine, particularly where mechanization has concentrated the production into a relatively small area, the active panels may constitute only a small percentage of the total underground territory which has to be kept open and maintained. Furthermore, these productive panels, operating at a fast rate of extraction, have a comparatively short life, so as mining continues over a property, the extent

of the worked out areas have a correspondingly rapid growth. While such areas are considered to be abandoned in a producing sense, they nevertheless remain as an integral part of the mine and as time goes on, they become quite extensive and constitute a real problem from a maintenance cost and safety viewpoint. Unfortunately, there is no way to prevent these areas from accumulating, because depletion is a natural sequence of extraction; however, outcrop mining does the next best thing which is

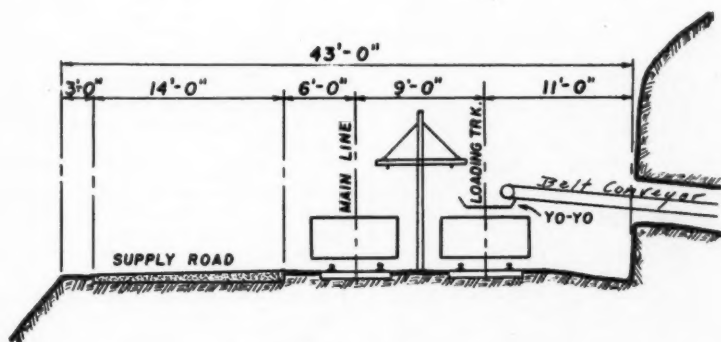


Fig. 3. "Yo-yo" car loader.

actually to "abandon," in the true sense of the word, its mined out panels.

### Advantages of Eliminating Mined-Out Areas

Opportunities for cost reduction in a system of this kind are self-evident. Of course, the normal cost for loading the coal from the seam and bringing it from the working face to the mouth of the panel entry in outcrop mining is the same as in any other mining plan. This also is true of the cost for the outside main haulage which must be constructed of high quality material and operated according to the best modern practices. Neither is there any difference in the methods or cost of



TYPICAL SECTION AT LOADING POINT

Fig. 2. Belt haulage loads mine cars at portal.



Fig. 4. Mechanical loader and shuttle car.

the surface preparation. But between the active panels and the cleaning plant is where the cost savings occur. Even though the outside haulage road must be kept in first-class condition, its operation is not handicapped by restricted space and poor visibility; its maintenance only extends from the subgrade to the top of the rail and there is no track cleaning in the usual underground sense; the customary mine deadwork

such as timbering, slate handling and rock dusting on the haulage ways and air courses—quite an extensive mileage in a modern deep mine—is not merely reduced in outcrop mining; it is entirely eliminated. Heavy duty pumps and long pipe lines are nonexistent; underground power substations with drill holes for the high-tension cables are not needed. Finally, and this is no insignificant item, the low cost of ventilating an outcrop

panel—using only a small fan, temporary brattices and no overcasts—is not in any way comparable to the greater cost of installing, operating and maintaining a ventilation system through the extended territory characteristic of the average deep mine.

### General Plan of Outcrop Mining

All the foregoing advantages are soon to be realized at the new Wright Mine of Consolidation Coal Co. (Ky.), which was started late in the summer of 1947 and is now in production. This operation located at Dunham, in southeastern Kentucky near the company headquarters at Jenkins, is a part of the celebrated Elkhorn Coal Field, served by the Big Sandy Division of the Chesapeake & Ohio Railway.

The area available for outcrop mining at this property is approximately 1100 acres, extending 3 miles each way from the tippie location. As shown in Fig. 1, the territory is to be mined by a series of independent panels, each one starting from the outcrop on the tippie side and driving through the mountain. When the opposite outcrop is reached, the panel will be worked retreating, and on completion, its mined out area will be abandoned. The average distance through the mountain from outcrop to outcrop is 2500 ft, and at this length

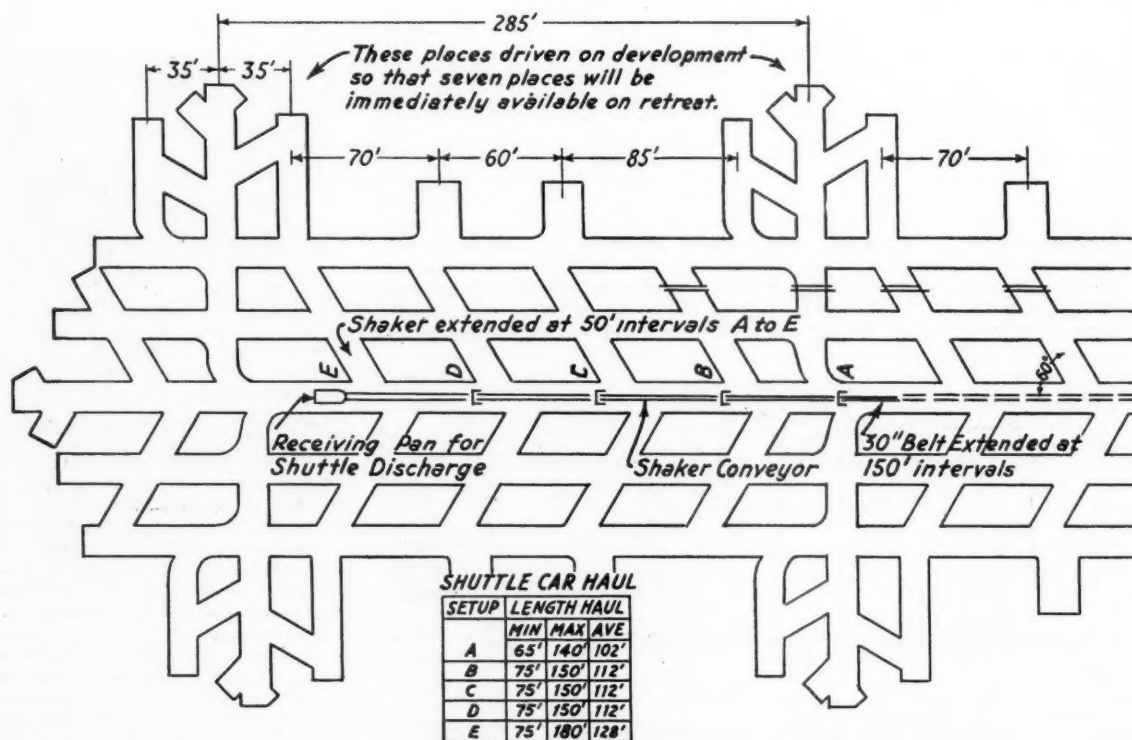


Fig. 5. Entry development with gathering haulage by shuttle cars and shaker conveyor.

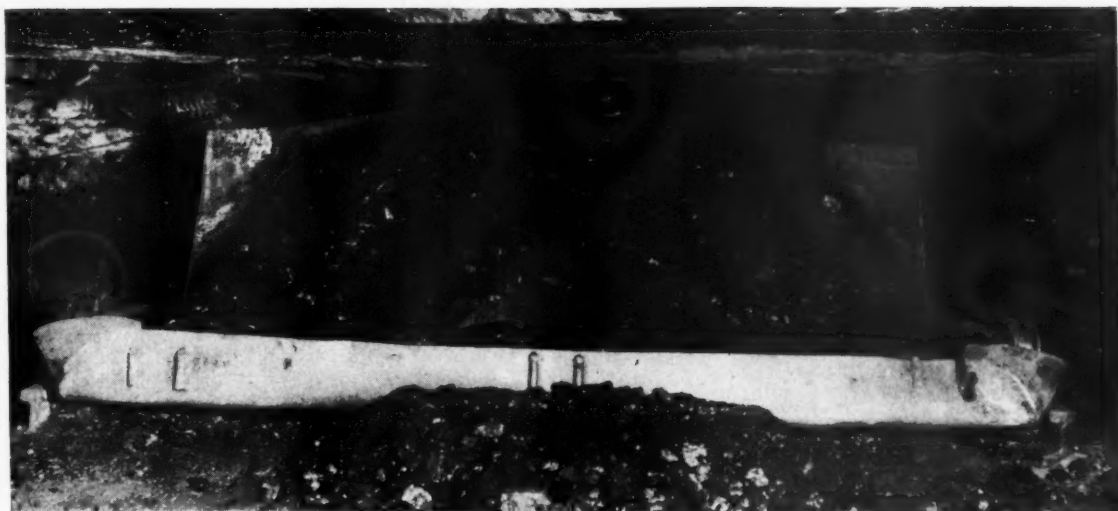


Fig. 6. Loading pan on end of shaker for shuttle discharge.

and with the production contemplated, the life of a panel will probably be about one year. However, it will be understood that the actual length and life of each individual panel may be somewhat greater or less than this average.

The seam mined is the No. 4 Elkhorn, having a total height of 45 in, which eliminates the necessity for rock brushing. There are some impurities but there is no underground hand-picking; full seam mining is practiced with everything going to the cleaning plant on the railroad. The coal lies nearly level with an average grade of 1 per cent, although there are local dips of as much as 8 per cent. Conditions generally are favorable for mechanization and the operation is 100 per cent mechanical—Joy loading machines, Sullivan tire-mounted universal cutters, hand-held electric drills and Baker-Raulang storage-battery tractor and trailers for timber and other supply delivery. A supply train may have as many as three trailers.

### Outside Track Haulage

The main underground haulage is a belt conveyor laid in the main panel entry and discharging at the drift mouth into a trip of mine cars. (See Fig. 2). From this point on, the outside haulage layout needs little explanation. The outcrop is "strip mined" to form the road-bed; the track is of 80-lb rail on wood ties, with convenient siding and run-arounds, and leads to a 2000 ton dump bin at outcrop level. From this bin the coal is conveyed down to the preparation plant about 200 ft below on the railroad along Elkhorn Creek.

At the present time only one panel is being worked and as the dump bin

has not yet been built, the main underground conveyor discharges into trucks at the portal. When the bin is erected, the outside haulage for the succeeding panel will be with locomotive and mine cars. The mine cars are of special design; these are to be the drop bottom type of about 30-ton capacity—practically railroad cars. The outside haulage locomotive will be a 20-ton unit (two 10-ton locomotives in tandem). At the mine car loading point a Goodman "Yo-Yo" is to be installed. As illustrated in Fig. 3, this is a short chain conveyor designed for quick reversing and its purpose is not only to prevent coal spillage at the end of the belt, but also to eliminate the necessity for stopping the main line conveyor while a loaded car in a trip is being moved ahead. A 48-in Jeffrey Aerodyne fan at the portal of the main air course

completes the outside installation. This is skid-mounted, bolted in easily handled sections for moving.

### Underground Methods

Underground, the mine is a so-called "trackless" operation with tractor-mounted loading machines and shuttle cars for service haulage. (See Fig. 4). Each loading machine is served by one 3½-ton shuttle, delivering to a Goodman shaker conveyor acting as an intermediate or gathering unit to transport the coal from the shuttle to the main belt. The haulage plan is designed to reduce the shuttle travel and on the main entry development, the average travel distance is calculated at 113 ft with 180 ft as a maximum. As shown in Fig. 5, the shaker is extended at 50-ft intervals, as the mining pro-



Fig. 7. Shaker conveyor loads directly onto main belt.





Fig. 8. Supply truck also used for man trip.

gresses, until it reaches its full length of about 300 ft; at this point, its drive is moved ahead, the main belt is extended, and the development continues. At the inby end of each shaker there is a large receiving pan, illustrated in Fig. 6, into which the shuttle unloads and which acts as a conveyor feeder. Having the capacity of one shuttle car, this device enables the shuttle to empty without any delay and prevents overloading the shaker unit, which in turn discharges by end-loading onto the main belt as shown in Fig. 7. This system now used on the main entry development will also be used, with slight

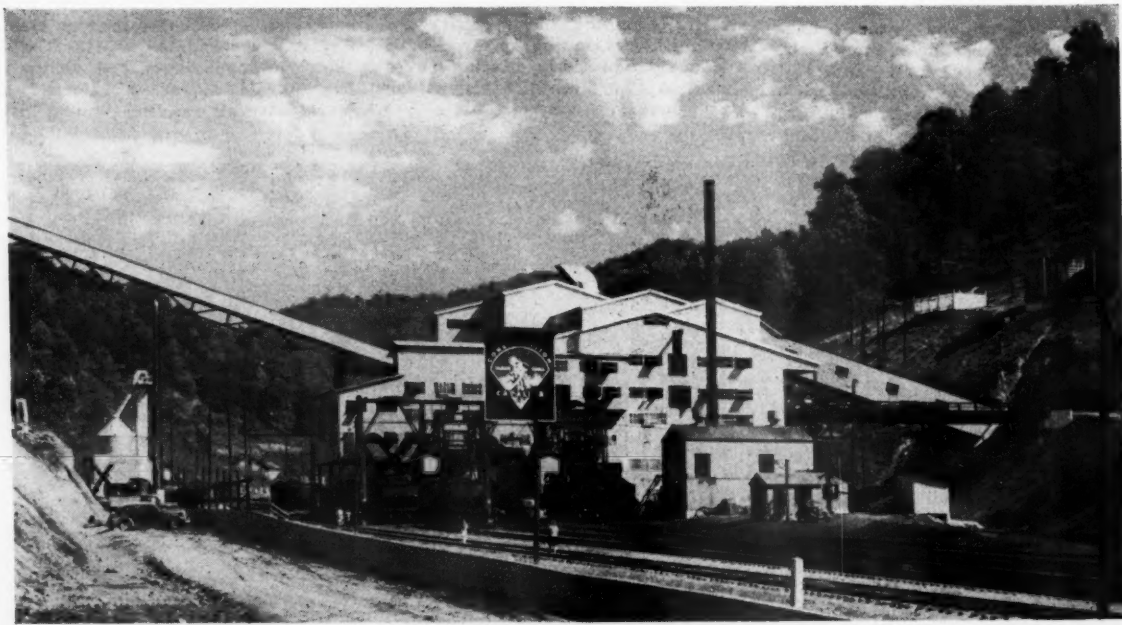
modifications, in the room mining.

The conveyor belt for the main haulage is 30 in. wide; its speed is variable from 220 ft to 440 ft per minute, with the capacity varying accordingly, from 160 to 300 tons per hr. The idlers are supported in steel frames of the usual design used in mining service for convenient assembly and dismantling, and the belt is made for extending in 150-ft lengths. This installation was furnished by the Goodman Mfg. Co. The Consolidation management agrees with the rather prevalent idea that it is not good economy to reverse a main line belt for taking supplies into the mine.

However, because of the comparatively short length of life of a panel, it was decided that a supply track would not be necessary; instead, a storage battery tractor with trailer is used, as illustrated in the head piece of this article and in Fig. 8. An entry parallel to the main belt entry provides a roadway for this equipment.

At the present time, the mine is entirely on development, driving a series of five main entries; these are 14-ft wide on 50-ft centers. (See Fig. 5). According to a tentative projection, the room entries will be turned at 285-ft centers, and will drive right and left for a distance of 265 ft which, including a 50-ft barrier pillar and a set of five main headings makes a total panel width of 720 ft. The rooms are also planned to be driven right and left off the entries and are to be 35-ft wide on 50-ft centers and approximately 95-ft long; the pillars 15-ft wide are not to be recovered.

The foregoing dimensions, and also the details of the plans for the underground operations are somewhat tentative at this time, in that there has been no previous mining experience in this seam of coal. Until mining conditions are determined, the actual projection which will be adopted for this property as well as the daily production and the exact amount of equipment required, are matters which may be subject to some future modification. However, it is believed that the general plans are basically sound and no great changes from the original forecasts and estimates are anticipated.



Consolidation's preparation plant at Dunham, Ky.

Photo—courtesy Fairmont Machinery Co.



# Annual Coal Convention

**A**RRANGEMENTS have been completed for the 1948 Coal Convention to be held at the Netherland Plaza Hotel, Cincinnati, on April 26-28. In its interest and importance to the industry, the coming meeting promises to set a new high, and a record attendance for a meeting that will not have exhibits is already assured. A preview of the subjects and

speakers for the sessions is given in the preliminary program on the following page. Representing the best thought of the industry, the various papers and discussions will cover the most important phases of mining—basic economic questions, as well as general and special operating problems. These all have the one objective of reaching higher efficiency in coal



**T. G. Gerow**  
*Truax-Truax Coal Co.*  
National Chairman

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**J. Robert Bazley**  
*J. Robert Bazley, Inc.*



**C. R. Bourland**  
*New River Co.*



**S. M. Cassidy**  
*Consolidation Coal Co.*  
(Ky.)



**E. R. Cooper**  
*Jones & Laughlin Steel Corp.*



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*Peabody Coal Co.*



**M. A. Evan**  
*Eastern Gas & Fuel Associates*



**J. H. Fulford**  
*Jeffrey Mfg. Co.*



**Wm. E. Goodman**  
*Goodman Mfg. Co.*



**R. L. Hair**  
*Colorado Fuel & Iron Corp.*



**J. B. Haskell**  
*West Virginia Steel & Mfg. Co.*



**A. K. Hert**  
*Snow Hill Coal Corp.*



**George R. Higinbotham**  
*Consolidation Coal Co.*  
(W. Va.)



**R. U. Jackson**  
*Hewitt-Robins, Inc.*



**Merl C. Kelce**  
*Sinclair Coal Co.*



**V. C. Kibler**  
*Blackfoot Coal & Land Corp.*

# Preliminary Program

## MONDAY, APRIL 26

### 10 A. M.—General Session

#### Opening Address

#### Increasing the Utilization of Coal

JOHN I. YELLOTT, Director of Research, Locomotive Development Committee

#### Synthetic Oil and Gas from Coal

CHARLES E. HEMMINGER, Senior Engineering Associate, Standard Oil Development Co.

### 12:30 P. M.—Luncheon

#### Impact of European Recovery Plans Upon the American Coal Industry

CAPTAIN N. H. COLLISON, Special Assistant to Secretary of Interior.

### 2:30 P. M.—Underground Haulage Session

#### Belt Conveyors for Main and Gathering Service

C. W. THOMPSON, Development Engineer, Weirton Coal Co.

#### Haulage System for Track-Mounted Equipment

JOE BOSE, Superintendent, Templeton Coal Co.

#### Combination of Track and Belt Conveyors

C. R. BOURLAND, The New River Co.

### 2:30 P. M.—Strip Mining Session

#### Coal Stripping Legislation

R. T. LAING, Mineral Producers Association of Pennsylvania

#### Stripped Land Reclamation—A Symposium by:

J. W. BRISTOW, Illinois Coal Strippers Association  
DR. A. G. CHAPMAN, Central States Forest Experiment Station  
T. C. CHEASLEY, Sinclair Coal Co.  
LARRY COOK, Ohio Reclamation Association  
OREL E. JOHN, Reclamation Development Co.  
L. E. SAWYER, U. S. Forest Service

## TUESDAY, APRIL 27

### 10 A. M.—Management and Safety Session

#### Attracting Young Men to Coal Mining

K. L. KONNERTH, General Manager of Operations, H. C. Frick Coke Co.

#### Developing Supervisory Personnel

RUSSELL W. BEAMER, Superintendent of Training, Rochester & Pittsburgh Coal Company

#### Safety in Coal Mining

JAMES HYSLOP, Executive Vice President, Hanna Coal Company

### 12:30 P. M.—Luncheon

#### The Industrial Application of Atomic Energy

H. A. WINNE, Vice President in Charge of Engineering, General Electric Co.

### 2:30 P. M.—Face Preparatory Session

#### Machine Cutting with Tungsten Carbide Bits

H. H. FLETCHER, Gen. Mgr., Dickinson Fuel Co.

#### Mechanical Kerf Cleaning

V. D. HANSON, Mechanical Engineer, Pittsburgh Coal Co.

#### Drilling and Blasting for Mechanical Loading with Airdox

R. L. ADAMS, General Superintendent, Old Ben Coal Corp.

#### Timber Setting and Recovery with Machines

GEORGE W. McCAA, General Superintendent, Consolidation Coal Co. (W. Va.)

#### Roof Support with Suspension Rods

C. C. CONWAY, Chief Engineer, Consolidated Coal Company (Illinois)

### 2:30 P. M.—Maintenance Session

#### Preventive Maintenance for Face Equipment

H. C. BEAN, Superintendent, Walter Bledsoe & Co.

#### Belt Care and Maintenance

J. A. BOTTOMLEY, Assistant Mine Supt., Sahara Coal Company

#### Power Distribution for Mechanical Mining

L. D. SINIFF, Mechanical and Electrical Engineer, Consolidation Coal Co. (Ky.)

### 2:30 P. M.—Strip Mining Session

#### Developments in Hauling Overburden

ALAN E. CODDINGTON, Engineer, Carey, Baxter & Kennedy, Inc.

#### Strip Mine Truck Haulage

LESTER E. BRISCOE, Electrical Engineer, Ayrshire Collieries Corp.

#### Vibrations in Surface from Heavy Blasting

JULES E. JENKINS, Vibration Measurement Engineers

## WEDNESDAY, APRIL 28

### 9:45 A. M.—Surface Preparation Session

#### What's New in Coal Preparation?

HENRY O. EBB, Coal Preparation Consultant

#### What Will the Industry Do About Fine Coal?

J. W. WOOMEY, Mining Engineer

#### Refuse Disposal from Cleaning Plants

##### (a) Anthracite Methods—

FRANK J. MEYER, Division Engineer, Philadelphia & Reading Coal & Iron Co.

##### (b) Appalachian Methods—

STEPHEN KRICKOVIC, Chief Engineer, Eastern Gas & Fuel Associates

##### (c) Mid-West Methods—

JOHN R. WILSON, Preparation Manager, Union Collieries Co.

### 2:15 P. M.—Mechanical Mining Session

#### Thin Seam Mining with Self-Loading Conveyors

P. R. PAULICK, Consulting Engineer

#### Thin Seam Mining with Conveyor-Loader

STANLEE HAMPTON, President, Tennessee Consolidated Coal Co.

#### Continuous Mining by Combination Cutting and Loading Machine

STANLEY BLOSE, President, Consolidated Coal & Coke Company

### 2:15 P. M.—Strip Mining Session

#### Draglines vs. Shovels in Deep Overburden

O. E. MAY, Supt., Northern Illinois Coal Corp.

#### Large-Scale Side Hill Stripping

HAROLD L. BAILEY, Pres., Bailey Construction Co.

### 6:30 P. M.—ANNUAL DINNER

production. Having emerged from the war and post-war years with much out-of-date equipment in use, the industry is now planning complete rehabilitation and is turning its talents to devising new methods and machines to go far beyond all past performance records. The 1948 convention will report on these new developments as they are being applied to mechanized mining, with presentations by coal men of outstanding experience in their respective fields—who are qualified to speak with authority on the task which confronts us today.

Recognizing that the attendance will present a complete cross section of the industry, the Program Committee planned a convention of broad scope, directed toward operators and manufacturers from all branches and all fields—deep mining and stripping, anthracite and bituminous. To permit such a wide coverage, ten sessions will be held. Each morning there will be one general session and each afternoon there will be two or more concurrent sessions, in separate rooms. In the mornings, subjects of interest to everyone in the industry will be discussed—such as increasing coal utilization; synthetic conversion of coal to oil and gas; coal preparation; and problems of management, safety, and personnel. Each afternoon program will include a special strip-mining session, and a deep-mining session dealing with special phases of underground operation.

A new feature this year will be motion picture films in advance of each

session—starting one-half hour before the regular program. The films, furnished by the U. S. Bureau of Mines, will show phases of other industries that have some direct application to coal mining. These pictures will give a further educational value to the convention and will serve an added purpose in bringing the audience into the meeting room so that the program may start on schedule time.

Supplementing the convention sessions, there will be luncheon meetings on Monday and Tuesday, with talks on general subjects of wide interest to coal men—such as the

(Photos not available)

W. W. Beddow  
Logan County Coal Corp.

P. H. Hunter  
Harnischfeger Corp.

P. P. Kerr  
New River & Pocahontas  
Cons. Coal Co.

G. A. Shoemaker  
Pittsburgh Coal Co.

application of atomic energy to industrial use and possibly the impact of European recovery plans on the coal industry of our own country. Evening entertainment will be arranged, and the convention will be concluded with the annual banquet on Wednesday night.



A. S. Knoizen  
Joy Mfg. Co.



Phelan McShane  
Westinghouse Electric Corp.



D. B. Mikesell  
American Brattice Cloth Corp.



F. E. Mueller  
Roberts & Schaefer Co.



H. H. Pancake  
American Car & Foundry Co.



C. B. Peck  
Anaconda Wire & Cable Co.



H. A. Reid  
United Electric Coal Cos.



J. L. Romig  
Atlas Powder Co.



Geo. L. Smith  
Rochester & Pittsburgh Coal Co.



Bradley Sparks  
Luzerne-Graham Mining Corp.



A. R. Stephan  
Mack-International Motor Truck Corp.



H. A. Treadwell  
Chicago, Wilmington & Franklin Coal Co.



Whitney Warner, Jr.  
Warner Collieries Co.



W. P. Young  
Bell & Zoller Coal & Mining Co.



HMS at Eagle-Picher's Central mill reduces 15,000-ton daily input to 6000 tons for further treatment.

# Heavy-Media Separation Processes—Present Status and Potentialities

By G. B. WALKER  
American Cyanamid Company

**H**EAZY-MEDIA Separation processes represent a practical commercial application of the standard laboratory sink-float test, recognized as the most efficient method of separating solids by gravity.

Metallurgists and coal-preparation technologists have long appreciated the possibilities of such a method of separation provided it could be applied economically on a large scale. Heavy liquids, however, although readily adaptable to laboratory test work, are not well suited to utilization on a commercial scale. Many years ago it was discovered that suspensions of finely ground solids in water approached the properties of heavy liquids in sink and float practice, the first industrial application being the use of a suspension of sand in water for the separation of coal

from slate. However, the low specific gravity of sand (2.65) makes it impossible to operate in the higher gravity range. In processes using sand, with strong upward rising currents of water, the separation takes place largely as a result of hindered-settling classification in a dense medium rather than by true sink and float and they are, therefore, not the most efficient in the low specific gravity range.

Heavy-Media Separation processes represent proven, efficient, low-cost methods for beneficiating a wide variety of mineral products and are widely used for the treatment of ores and are applicable to the cleaning of coal. Today, in the neighborhood of 2,000,000 tons per month of a wide variety of ores, metallic as well as nonmetallic, are being successfully handled in this country and abroad. The ores treated include iron, zinc, fluorspar, magnesite, garnet, tin, and lead-zinc. Many additional plants for the treatment of coal as well as ores are now under construction or design.

## Successful Original Installation

The first commercial application of HMS was pioneered by the American Zinc, Lead & Smelting Co. at Mascot, Tenn. In 1939, a 9-ft cone utilizing galena (PbS—spgr 7.5) medium was placed in operation and this installation has since been handling up to 160 tons of ore per hr. These processes were later licensed to the Eagle-Picher Mining & Smelting Co. This second plant to adopt HMS also used galena medium. The plant, located in the Central Mill at Cardin, Okla., commenced operation in February 1939, and has treated as much as 18,000 tons of zinc ore per day. Subsequently this plant has adopted ferrosilicon in place of galena.

For the treatment of some of the low-grade iron ores of Minnesota a test unit was built at the Merritt Plant of Butler Brothers, on the Cuyuna Range. Although originally designed to use galena as the heavy medium, but it was found that galena,



being soft, overslimed, with a resultant high loss of medium. The recovery of galena slime by flotation was difficult, much of the galena was lost, and it was impossible to maintain a satisfactory operating gravity. Hence the use of ferrous medium and its magnetic recovery and control was developed, and another pilot plant was built, using ferrosilicon as the heavy medium. Ferrosilicon (an alloy composed of 85 per cent iron and 15 per cent silicon, sp gr 6.9) proved to be ideally suited for this work, being rust and abrasion-resistant as well as highly magnetic, and hence easy to recover by means of magnetic separators. Two full-scale HMS plants were built by Butler Brothers—one on the Mesabi Range, in 1938, and the other on the Cuyuna Range in 1940. Recently two additional plants have been built by Butler Brothers.

### Ferrous Media Offer Advantages

Unquestionably, ferrous media have the widest application of any media developed, for the following reasons:

- (1) Ease of recovery and cleaning by magnetic means.
- (2) Low consumption per ton of ore treated.
- (3) Resistance to abrasion.
- (4) Widest range of media densities, including higher workable densities (1.25 to 3.4) than have been found possible with nonferrous media.
- (5) Space required for recovery and cleaning of ferrous media is considerably less than that for nonferrous media.
- (6) Ferrous media require lower capital investment and operating costs for media recovery and cleaning.

However, where high-grade galena concentrate is readily available and means exist for satisfactorily marketing the galena recovered it is a satisfactory medium.

HMS processes offer the following positive advantages, amply demonstrated on a wide variety of ores—

nonmetallic as well as metallic, and on coals:

- (1) Ability to make sharp separations at any predetermined specific gravity ranging from 1.25 to 3.4; and continuously maintain this preselected specific gravity within plus or minus 0.01. Efficient cleaning methods eliminate viscosity problems.
- (2) The specific gravity of the separating medium can be changed at any time, and within a few minutes, when necessary to meet changing characteristics of feed.
- (3) Ability to remove sink, or refuse, continuously.
- (4) Ability to treat full-size range material without presizing.
- (5) HMS plants can be started and shut down without loss of values or operating efficiency.
- (6) The medium used for separation is relatively low cost and losses incident to the operation are negligible (0.2 to 0.8 lb per ton of feed). Since the medium can be substantially completely recovered from the separated products, loss of values and medium due to the inefficient presizing caused by variable moisture in the feed is no longer a serious consideration.
- (7) Low operating and maintenance costs.
- (8) Separatory units have large capacity and occupy relatively small space.
- (9) Capital cost low in comparison with installation of competitive processes of equal capacity.

In general, it may be stated that HMS processes will treat any ore in which the valuable mineral constituents have an appreciable difference in specific gravity from the worthless gangue. This difference in specific gravity can be less than that required for efficient separations by jigging or tabling.

In general three types of ore are amenable to HMS processes: Ores whose valuable constituents are liberated from unwanted mineral at a grind of 48 mesh or coarser; ores containing valuable minerals in the form of lenses or veins separated from each other by barren gangue; ores con-

taining barren gangue which can be rejected after coarse crushing.

Three main functions are performed in HMS processes: The rejection of a waste product leaving an enriched product for further concentration by other methods after reduction in size; the production of a finished concentrate and a rejectable waste in one operation; the production of a finished concentrate, and a low-grade reject for additional treatment.

HMS processes have a wide field of usefulness as preconcentration methods for removing gangue, at low cost, after coarse crushing. They, therefore, offer a cheap and effective means for making ore out of sub-ore, waste dumps, and tailings, by concentrating the valuable constituents into a smaller product of sufficiently high grade to warrant treatment by more expensive methods such as flotation or cyanidation.

### Coordinate Mining Method with Separation Process

The application of HMS processes is closely related to the type of mining practiced or contemplated. It is, therefore, necessary to study the geological structure of the deposit to determine whether high-cost selective mining methods may be eliminated through use of these processes to reject waste rock mined over greater widths. Similarly, by locating the Heavy-Media plant underground, a hoisting bottle neck may be eliminated, at far less expenditure of time and money than would be required to sink and equip a new shaft. Installation underground, moreover, provides a waste product for back filling at no additional cost.

Of particular importance to established operations are the opportunities through HMS processes for increased profits by lowering of costs, for increases in production, and for reduction in over-all labor requirements per ton of metal or mineral produced. An existing flotation mill, for instance, may greatly increase its metal output through increasing mill heads by installing HMS before fine grinding.

### Wide Size Range Can Be Handled

In general, it may be stated that these processes are applicable to the separation of sizes down to as small as 35 or 48 mesh. Although in some instances it is feasible to handle run-of-mine ore without presizing, the efficiency of separation drops off on sizes below 48 mesh. For the treatment of sizes up to 3½ in a separatory cone may be used. Other apparatus is available for treatment of sizes larger than 3½ in.

Regardless of the type of separatory vessel used, the underlying prin-

**Differential-gravity methods of separating valuable constituents of an ore from the gangue materials have had nearly 10 years of commercial operation. Laboratory tests and pilot-plant operations have pointed the way towards the increased application of these processes. As more economic recovery of useful minerals is combined with the ability to separate coarse mineral-containing particles from waste in sink-float methods, industry has been expanding their application in the separation of metallic and nonmetallic ores and in the preparation of coal. Here an expert in the field presents a thorough analysis of the Heavy-Media Separation processes developed by his company.**

- (1) Preparation of the feed.
- (2) Heavy-Media Separation.
- (3) Removal of medium from the separated products.

The harmful effect of slime can be reduced to a great extent by the use of efficient methods for cleaning the medium. The development of ferrous media and magnetic recovery has eliminated the need for complete slime removal before treatment because of the efficiency of magnetic concentration. At one operation using ferrosilicon the ore treated is high in slime content. The only equipment employed for 125 tons per hr is one 4-ft by 12-ft screen fitted with washing sprays for the first 6 ft only. This treatment only partially deslimes the ore, in fact a substantial quantity of

For the treatment of sizes below 10 mesh, a modified flow scheme has been developed. Essentially, this flow scheme involves the use of dual magnetic cleaning circuits wherein the undersize float and the undersize sink products from the screens are separately subjected to magnetic separation. The magnetic separators recover the medium for reuse and the tailings from these separations are



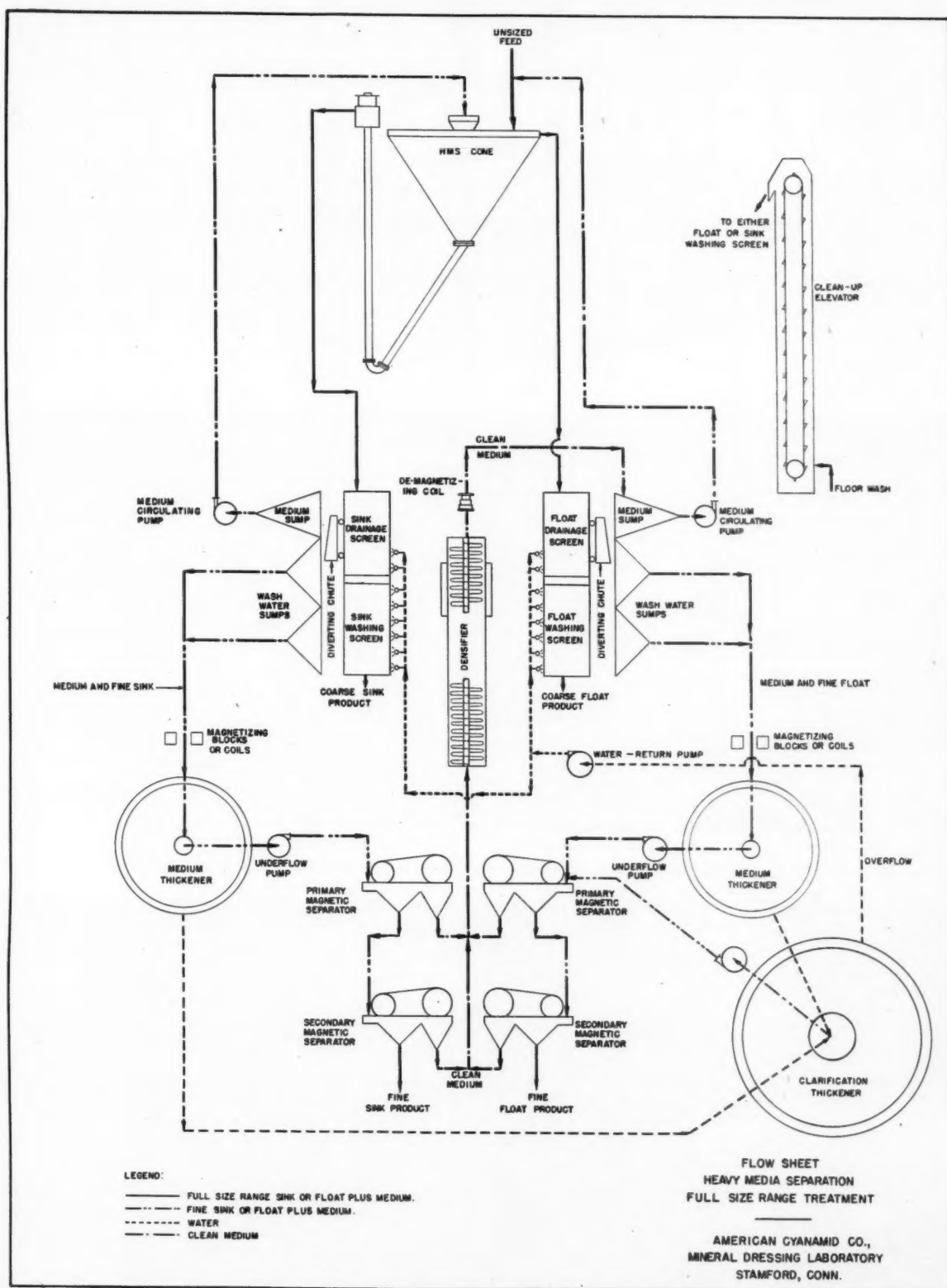


Fig. 2. Full size range material can be treated without presizing. Continuous operation and high recovery of medium are features of HMS.

# **JOY LOADERS and SHUTTLE CARS**

**are proving every day, month in and month out, that they do increase output, and that they do cut costs!**



Loading iron ore,—there is nothing complicated or complex about the operation and control of a Joy Loader—every move is plainly visible to the operator.



The operator not only has finger tip control of the Loader at all times—but he is safe and protected.



The strong swinging arms of the Joy 18-HR digs into the muck—loads iron ore fast, continuously.



The Joy 18-HR picks up the muck, and transports it, fast, into a Joy 60-E Shuttle Car.





Joy 18-HR loading shuttle car with iron ore—note simplicity of operation.



Joy 60-E Shuttle Car enroute to conveyor—fast, safe and built to stand hard usage.



Joy Shuttle Car emptying iron ore into Joy Elevator Conveyor—operation is fast—saves time and labor.



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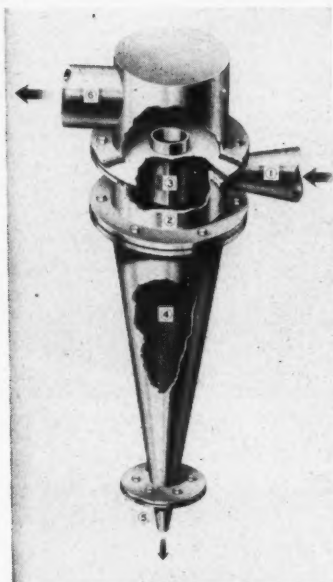


Fig. 3. Centrifugal force is utilized in the Duluth Cyclone.

either a finished float or a finished sink product as the case may be.

The flow sheet shown in Fig. 2 describes the equipment used and the flow of products and medium through the circuit.

It will be noted that just as in the case of the flow sheet shown in Fig. 1, a certain portion of the medium removed on the drainage screens is returned directly back to the separatory cone. The amount thus returned is controlled by the position of the diverting chute and is dependent upon the quantity of undersize float and sink in the original feed. It will be apparent that when treating a feed containing a large proportion of undersize material, it becomes necessary to divert a greater amount of drainage medium to the cleaning circuit than would be the case when the cone feed contains a smaller proportion of fines. In other words, the amount of fine material that can be recirculated back to the cone with the medium depends on just how much can be tolerated in the cone without

interfering with the separating efficiency of the medium. Eventually, of course, all of the fine material in the separatory cone circuit reports as finished float or finished sink. The advantage of recirculating a portion of the fines with the drainage medium is that a saving in the size of the magnetic separator units is thereby effected. Instead of having to clean at one time, all of the medium and accompanying fines discharged from the cone with the float and sink products, only a portion of it goes to the magnetic separators - the remainder is recirculated back to the cone.

### Cyclone Separator Applicable to Finer Sizes

During World War II, the scientists and engineers of the Dutch State Mines conducted a great deal of research work to develop more efficient coal cleaning methods. The Dutch cyclone separator they developed is particularly adapted to the treatment of minus  $\frac{1}{4}$ -in. material. It uses a suspension medium to determine the specific gravity of separation but operates on fine material with high efficiency because of the application of centrifugal force which greatly augments the speed of separation obtained under the influence of normal gravity. The cyclone separator used with magnetic medium and the twin cleaning circuit is expected to extend the lower size range of HMS down to the top size normally treated by froth flotation.

As a thickener or desliming the Dutch cyclone offers interesting possibilities. The cyclones have an astonishing high capacity and are of simple construction.

The feed suspended in medium is pumped into the cyclone tangentially through the inlet orifice. Centrifugal force causes stratification of the heavier particles on the wall of the cyclone together with medium and light particles. Near the apex of the cyclone a gravity build-up occurs and the light fraction together with

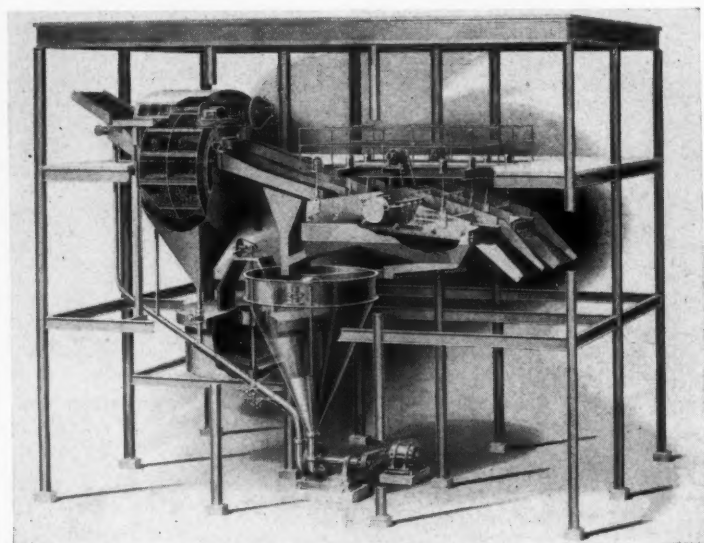


Fig. 4. The Link-Belt float-sink concentrator handles large coal in quantity in a small space.

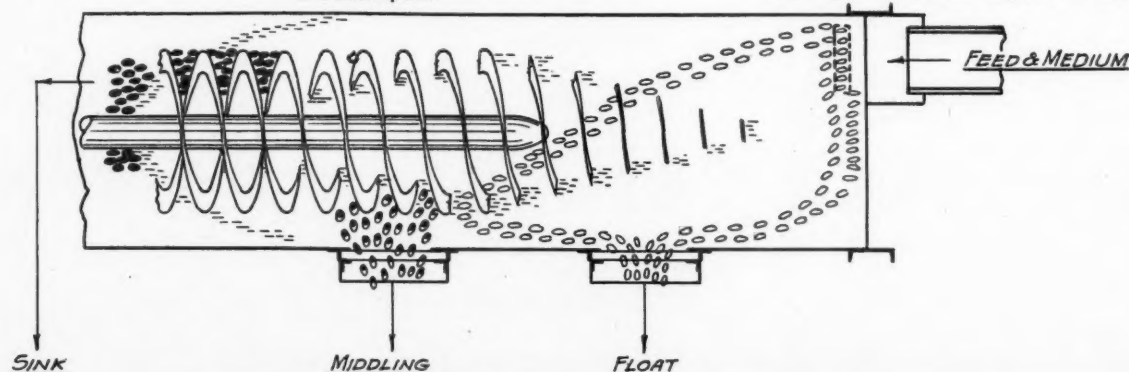


Fig. 5. Use of the Akins classifier as a separatory vessel eliminates air lift for sink removal.

medium enters the rising inner vortex of the cyclone.

## Varied Equipment Meets Special Problems

The scope of the HMS processes is not limited to the use of cone-shaped separators. Other shapes have been developed and used for ores presenting special problems of treatment.

A new separatory vessel for use in Heavy-Media has been invented by the engineers of the Link-Belt Co., designed particularly for the treatment of large size coal. A unit was installed in an operating coal cleaning plant in the Pittsburgh district over a year and a half ago. The vessel has demonstrated its ability to mechanically handle large coal and large tonnages. Plans are now being made to install Link-Belt vessels in what will be one of this country's largest coal cleaning plants. Several smaller installations are contracted for.

## Classifier Adapted to HMS

A development of considerable promise was reported recently by E. C. Bitzer of Colorado Iron Works. Mr. Bitzer and his associates have adapted the Akins classifier for use as a Heavy-Media separatory vessel. Mr. Bitzer has had outstanding success with the Akins separator treating ores of the Iron Range in Minnesota. The principal advantages of the vessel are reduced head room and elimination of the air-lift for sink removal. The plant can be shut down at the end of the shift, or in event of power failure, without draining the vessel.

Although Heavy-Media Separation processes have found their widest application in operations treating substantial daily tonnages, they are equally applicable to small tonnage operations. For concentrating ores from deposits with limited reserves, mine dumps, and retreatment of coarse, gravity tailings piles, or to serve as a pilot plant for demonstrating the efficiency of HMS on current production or during development of new properties, a semi-portable unit has been developed. In this unit the essential pieces of equipment have been reduced to meet minimum requirements consistent with high separating efficiency, in order that capital costs may be reduced to a minimum. As might be expected, operating cost per ton for the semi-portable unit will be somewhat higher than for standard units treating tonnages at a higher rate.

A typical unit of this type is the Mobil-Mill, offered on a rental or sale basis by Western Machinery Co. An installation of this unit is illustrated in Fig. 6. These units are supplied with either a 5-ft diam or a 7-ft diam cone. The units are self-con-

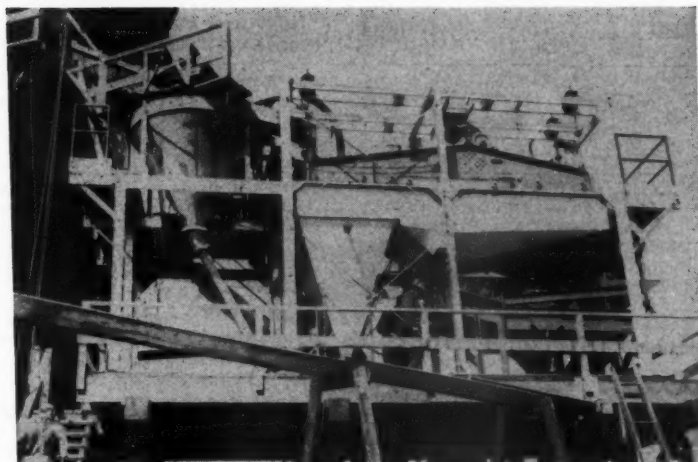


Fig. 6. Mobil-Mills are available on a rental or sale basis for small properties or pilot plants.

tained and prefabricated so that a small field crew can erect and have a Mobil-Mill ready for operation in a few days. These small plants have been well received. Several are operating at small properties as production units. Others have been installed as pilot plant units for bulk sampling mines and dumps. Actual operating experience has shown these units to be efficient metallurgically, easy to operate on either a continuous or a part-time basis and operating costs are low. The unit illustrated is located at a producing shaft. It can treat various types of ore representing different mineralized areas, or the products of various mining methods. In this way the optimum economic relationship between mining method, ore cut-off point and pre-concentration can be determined.

Table I is a typical equipment list for a plant designed to treat 100 tons per hr, giving the size of each unit, its connected horsepower and estimated U. S. fob factory cost. It will be noted that of the total of 201 connected hp, 40 hp on the cleanup pump would normally be used only on start-ups and to gather floor wash.

In a typical plant layout designed for the treatment of 100 tons per hr of feed, the equipment required can be compactly arranged and one operator can view and control all essential parts of the process. The feed enters the system at about 26-ft elevation and leaves the system at about 24-ft elevation losing slightly less than 2-ft elevation during treatment.

Table II is a breakdown of actual Iron Range operating costs. It should

TABLE I—ESTIMATE OF EQUIPMENT COST, HEAVY-MEDIA SEPARATION PLANT

Feed: Bituminous  
Tons Cone Feed Per Hour: 100  
Size of Cone Feed:  $-1+\frac{1}{4}$  in.

Unit	No.	Size	Conn hp	Est. Cost fob Factory
Heavy-Media Separation cone	1	14 ft	7½	\$7,900.00
Refuse drainage and washing screen	2	3 x 10	10	3,520.00
Coal drainage and washing screen	2	4 x 10	10	3,800.00
Medium thickener	1	20 ft	3	5,550.00
Primary magnetic separator	1	36 in.	3	3,550.00
Secondary magnetic separator	1	36 in.	3	3,500.00
Medium densifier	1	48 in.	5	5,800.00
Demagnetizing coil	1			250.00
Magnetizing block	1			220.00
Motor generator set	1	5 kw	10	488.00
Air compressor	1	150 cfm	30	1,850.00
Medium circulating pump	1	8 in.	50	2,330.00
Thickener underflow pump	1	3 in.	10	650.00
Thickener overflow pump	1	500 gpm	20	600.00
Cleanup pump	1	6 in.	40	1,410.00
Total			201½	\$41,468.00



TABLE II—ESTIMATED OPERATING COST—HEAVY-MEDIA COAL CLEANING BASED ON IRON RANGE COSTS

	Man-Hr	Actual Iron Range Annual Cost Cents Per Ton Cone Feed	Estimate for Coal Cleaning
Operating labor (\$7,836.06):			
Operating .....	8424	....	....
Operating repairs .....	795	....	....
Total .....	9219	1.25	1.25
Power (1.92 KWH at 1.30) .....		2.23	2.23
Ferrosilicon (0.80 lb at 4.14) .....		2.96	....
Magnetite (0.50 lb at 0.5) .....		....	0.25
Maintenance labor .....	6638	0.85	0.85
Operating and maintenance supplies .....		0.75	0.75
Total .....		8.04	5.33

be pointed out that these figures represent annual cost against tonnage treated during the summer operating period. The cost of maintaining key personnel through the nonoperating winter season is included.

The second column is an estimate of operating cost for coal cleaning based on Iron Range costs.

### HMS Used on Variety of Ores

As previously mentioned, one of the principal functions of Heavy-Media is to reject a barren fraction of the mine-run ore after only coarse crushing. The enriched or preconcentrated product is then subjected to fine grinding and froth flotation. Many operations use HMS to treat large tonnages of low-grade ore without enlarging the capacity of the more expensive fine-grinding and flotation sections. Hence advantage can be taken of reduced mining costs due to the use of cheaper non-selective mining methods. Thus the more marginal ore can in many cases be classed as milling ore and ore reserves thereby expanded.

The Mascot operation of American Zinc Lead & Smelting Co. is an example of such practice. The Mascot Mill has a rated capacity of 4000 tons per 24 hr. Mine output is crushed to minus 2-in. and screened at  $\frac{3}{8}$ -in. The minus 2-in. plus  $\frac{3}{8}$ -in. rock representing 68 per cent or 2700 tons is treated by Heavy-Media which rejects 55 per cent or 2200 tons of discardable rock for sale as railroad ballast. The feed to fine grinding and flotation is therefore reduced to less than half of mine output.

The Central Mill of the Eagle Picher Mining & Smelting Co. operates on a similar basis. This plant has a rated capacity of 15,000 tons per day. Mine ore is crushed to minus  $1\frac{1}{2}$ -in. and screened on  $\frac{3}{8}$ -in. The minus  $1\frac{1}{2}$ -in. plus  $\frac{3}{8}$ -in. product represents 76 per cent of run of mine or 11,400 tons per day. Treatment of this fraction by Heavy-Media Sepa-

ration results in the rejection of 61 per cent or slightly over 9000 tons of discardable rock which can be marketed as ballast. The concentrate plus the untreated minus  $\frac{3}{8}$ -in. fines are subjected to the more costly operations of fine grinding and froth flotation.

A 150 tons per hr pilot plant for diamond recovery is now in operation in South Africa. At this plant the "diamond ground" is crushed to pass 1-in. opening and screened on 10 mesh. The minus 1-in. plus 10 mesh "ground" is fed to Heavy-Media. The ratio of concentration will be variable—but will be extremely high. The adoption of Heavy-Media for "diamond ground" treatment represents the first new concentration plant introduced in diamond recovery practice in about 30 yrs. The Heavy-Media concentrate is treated on grease tables for final upgrading.

Another Heavy-Media Separation plant that operated as a preconcentration unit was the Ore & Chemical Corp. plant at Leadville, Colo. The HMS plant operated by Compania de Minas de Colquiri in Bolivia performs as a preconcentration step on tin ore. At this plant three times as much barren rock is rejected as was previously rejected by 15 women sorters. The concentrate and the untreated fines are subject to fine grinding and gravity concentration.

The Barton Mines Corp., which is the world's principal producer of abrasive garnet, employs HMS as a preconcentration step to reject barren gangue after coarse crushing. The reject fraction amounts to 70-80 per cent of the feed tonnage. The introduction of Heavy-Media at this operation has had the effect of greatly increasing the overall recovery of garnet as well as the capacity of the existing plant at moderate capital cost.

Another large field of application for Heavy-Media Separation is its use as a means for producing finished concentrate. In this regard, the largest

tonnage application has been on the Iron Range in Minnesota where five plants operated this summer and two additional plants are scheduled for next year.

General practice on the Iron Range involves the treatment of ore sized 2-in. or 3-in. by  $\frac{3}{8}$ -in. So-called "closed-top" cones were originally used but all but one of the cones have been replaced by Akins separators. HMS is applied to ores classed as "jig-ores." Various types of jigs have been experimented with on the Iron Range, but the superiority of HMS over jigs can best be defined by the fact that a substantial tonnage of shipping grade ore has been recovered from old jig tailing piles.

Five HMS plants are now operating in the Illinois-Kentucky district and all are producing finished fluorspar as a sink product. This district offers another comparison between jigs and Heavy-Media in that it is reported that one operator recovered enough spar from the retreatment of a jig tailing pile to pay for his plant—and the spar recovered from the jig tails was of higher grade than the concentrate produced by the jigs from the original ore.

An outstandingly successful Heavy-Media operation in the concentrate production category is that of the Northwest Magnesite Co. of Chewelah, Wash. Here the problem is to select magnesite from high-magnesia dolomite. Prior to the installation of Heavy-Media the magnesite was hand-sorted. A crew of approximately 150 men hand picked high-grade rock from the broken rock pile at the quarry face. The remainder was shoveled to a waste dump. Labor shortages seriously curtailed production and a Heavy-Media plant was installed. Now shovels move the entire quarry output to the Heavy-Media plant. The old waste dumps are also treated and yield a substantial amount of high-grade magnesite.

In the three preceding examples of the application of Heavy-Media for the production of a finished concentrate, the concentrate has been the heavy fraction of the feed and has been recovered as the sink product. The light constituent of the ore can also be recovered as marketable product. For example crude brucite, the hydrate of magnesite, can be concentrated by Heavy-Media. In this case the brucite is the lightest fraction and the float is therefore the finished product.

A tremendous field for Heavy-Media is in coal cleaning. A 250-ton per hr pilot plant has been operating with outstanding success in the Pittsburgh district for the past year and a half. The success of this unit together with extensive pilot plant work at Stamford has created great interest among coal

producers. Three plants are under construction or design for the production of metallurgical coal. Two of these plants, each having a capacity of 20,000 to 25,000 tons per day, will clean coal at a low gravity not attainable by any other coal-cleaning method.

In the anthracite field the process has demonstrated its ability to recover more coal than existing coal-cleaning methods because of its ability to operate at higher specific gravities. A plant having a capacity of 175 tons per hr is now being designed.

The future of HMS appears bright in many fields. As regards large tonnage operations coal will predominate. The increased use of mechanized mining methods, full-seam mining and high-speed loading will result in dirtier run-of-mine coal and will throw a greater load on the cleaning plant. Cheaper mining methods together with the depletion of high grade metallurgical coal reserves and the realization by blast-furnace operators that clean coke is as important as clean iron ore for the attainment of maximum furnace output will justify the adoption of a precise and flexible coal cleaning method. In the domestic coal field the same underground trend exists and it is to be expected that the consumers of domestic coal will in the future demand specification coal. Under such a market and with keen competition the domestic coal producers will need a precise and flexible coal cleaning method.

It is to be expected that the use of Heavy-Media in the iron ore field will steadily increase as deposits of direct shipping ore are reduced and lower grade deposits must be utilized.

In the field of nonmetallics the cur-

rent pilot plant work in diamond recovery is promising of a large tonnage application. Smaller applications have been demonstrated on topaz and spodumene bearing ores. Laboratory and pilot plant work have demonstrated the applicability of Heavy-Media for the concentration of potash ore—both in this country and abroad. Coarse halite and sylvite products of marketable grade have been made.

Recent test work at Stamford on samples of unsatisfactory gravel from a bank near a large concrete construction project has shown the feasibility of using Heavy-Media for the removal of light, flat constituents which would cause concrete failure and make the gravel unusable.

In the field of cement manufacture Heavy-Media offers possibilities. One foreign producer has exhausted his high grade limestone deposit. In order to use limestone from a new deposit it will be necessary to pay substantial transportation costs or move the plant. Laboratory test work in London and exhaustive tests at the quarry has demonstrated the ability of Heavy-Media to produce a satisfactory limestone from the low-grade rock remaining in the deposit at substantially less expense.

In the field of base metals, HMS has been applied as a preconcentration step to enrich the feed sent to an existing flotation plant. Preconcentration has been advantageous in some cases as a means for increasing metal production without increasing the expensive fine grinding and flotation units. In other cases preconcentration has been applied after the exhaustion of the high grade ore and its use has greatly extended the life of the mine. The fact that HMS has

demonstrated its ability to upgrade submarginal mineral deposits into the "ore" classification suggests that it would be advisable for geologists and evaluation engineers to consider the amenability of any sub-marginal deposit to a cheap method of preconcentration which would recover the mineral as a product properly classed as "ore." The same line of thought should be applied underground. The availability of an efficient and inexpensive preconcentration process may make it profitable to employ bulk mining methods underground or to mine borderline rock.

When our geologists, evaluation engineers, and mine managers face the problem of appraising the marginal mineral deposits, from which it appears our future base metal supplies must come, the possibilities offered by cheap, bulk, mechanized mining methods followed by an inexpensive preconcentration process should be weighed together with the usual assay sheet.

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Filtering ferrosilicon media at the Central mill of the Eagle-Picher Co.

# Time Studies in Mechanized Mining

★  
By P. R. PAULICK  
Consulting Mining Engineer  
Library, Pa.  
★

## Accurate Time Studies by Qualified Engineers Will Serve to Establish Performance Standards for the Various Operations of Mining

**J**UST after the turn of the century, Frederick Winslow Taylor, who is generally conceded to be the father of time studies, inaugurated a program of extensive experiments and investigations into the cutting speeds of various tools and machines, the manual handling of pig iron, etc. The results obtained by these experiments were so astounding (as much as 60 per cent to 100 per cent increase in output over the old methods was obtained), that a veritable storm of controversy was released. Taylor in his experiments showed, what should have been an evident fact, that the workman was not in a position to experiment and find the one best way of doing a job. A workman's skill at best consists of little more than the accumulated knowledge of his predecessors. He has no knowledge nor means of determining the value of new methods, new tools or machines. The controversy continued. Many industrial leaders could not visualize how anyone, apparently unfamiliar with the existing working conditions, could, with a stop watch, correct the inefficiencies under which the men worked, when the foreman with his years of experience could not make the corrections. However, some of the more enterprising leaders believed Taylor had uncovered something worth while and tried the system in their own plants.

From the discussion and controversy for and against the new system, that raged throughout the industry, was born the present system of mass production. The basis of mass production as we all know it, is the breaking down of a given job into elements and studying each elemental operation, by means of time and motion studies, from which the one best way of doing the job is determined. This plan is carried through a series of jobs and a continuous operation devised. The value of this subdivision and specialization of labor and meth-

ods has been made a primary reason for the leadership of the American mass production system; the outstanding example being the automobile manufacturing industry.

### Time Study Establishes Goals

It has been definitely proven that one of the most effective ways to obtain profitable results is to establish a definite goal of attainment for men and machines. And for the purpose of determining this goal there is no better method than time studies by which definite accurate standard production capacities of men and machines are established. Time studies are also used to analyze and correct faulty or inefficient operating practices, determine and establish the one best way of doing a job, eliminate delays, etc. The standard production capacities set up from time studies are used to compare actual results ob-

tained either daily or monthly, and an efficiency rating is given each unit. High production per man or machine and low unit cost is dependent upon the intelligent use of a definite task as a measure of a day's work and not upon the time spent on the job by a workman or machine.

The foregoing has special application to mechanical coal mining where a high unit cost can be usually traced to the following three principal sources, all of which are susceptible to time study analysis and correction: (1) Losses due to failure to use mine area effectively, absence of concentration, and failure to use equipment and labor to its full capacity; (2) losses due to unnecessary delays, interruptions, insufficient labor, tools, supplies, etc., lack of proper mechanization equipment, and poorly planned mining system; and (3) losses due to carrying excessive and unbal-



Time study data must be intelligently analyzed.

Extract of address presented to the joint meeting of West Virginia Coal Mining Institute and Central Appalachian Section of AIME, Charleston, W. Va., Dec. 12, 1947.



anced supply stocks, such as repair parts, timbers, ties and rails.

### Time-Study Engineers Require Special Qualifications

At any mine complete production standards can be set up from detailed time studies for all types of work; loading machines in rooms and entries; cutting machines in rooms and entries, and the same for drills, motors, trackmen and timbermen. Before making an analysis of a detailed time study, however, it would be interesting to note the chief characteristics a good time-study engineer should possess. Like all men holding responsible positions, the time-study engineer must be a man of high caliber, one who can carry out the true aims and principles of time studies and get the desired results with the least amount of friction. In a mine where time-study principles have been practiced for some time this is a comparatively easy matter, but in a mine where time studies are new to both men and management the best qualities of the engineer must be brought into play if antagonism is to be avoided and satisfactory results obtained. Every time-study engineer should possess the following characteristics:

(1) *Personality and Tact.* Personality is an asset in any line of work, but it is especially so in time-study work. A time-study engineer must get along with men in a positive way, rather than a negative way. He must be able to establish new methods and plans without friction to designers of the old; naturally, a great amount of tact is necessary.

(2) *Patience.* Patience we are told is the greatest of all virtues, and the time-study engineer must have an abundant supply. There will be times when the fruition of his plans and methods will be delayed again and again, testing this virtue to the utmost. He must remain calm in the face of excited and angry men and be able to convince them of the true value of the proposed method. He must take calmly the lack of cooperation and stand both just and unjust criticism.

(3) *Judgment and Self-Confidence.* Clear, honest judgment is needed in determining the intrinsic worth of new ideas. He must be broadminded and be open to conviction on all subjects and be able to analyze from all angles, thus basing his conclusions on facts rather than outside desires. He must be able to judge men, especially during a time-study observation, and know if their best effort is being given. Furthermore, he must have complete confidence in himself and his work because it is natural that new ideas meet with opposition, and unless he does have confidence and optimism he will get gloomy predictions. Once he

doubts himself in the face of opposition his case is lost.

(4) *Education.* Obviously this prerequisite is essential in all lines of responsible work, but especially so in a time-study man. In addition to academic training he should have good practical knowledge and experience in all phases of mining work so as to properly balance his judgment and perspective and thus properly correlate theory and practice. Above all, he must be well grounded in English and possess writing ability because most of his work and findings are presented in written form. His reports must be clear to be convincing.

(5) *Mental Ability.* Time-study work is primarily analytical. Thus a good time-study engineer must be analytical in viewpoint, dissecting and assembling elements to form new methods. He must be alert and on the lookout for new ideas, improvements, and ways to do a job better and quicker; he must like to work and solve problems.

(6) *Accuracy.* A good time-study

### Time-Study Procedure

Making a time study does not mean merely the recording of the elapsed time during the performance of a job. In the fullest sense of the word, time study means the breaking down of a job into its elemental operations and subjecting each of these to close scrutiny and analysis in order that unnecessary movements, delays, and waits may be eliminated; that all motions, methods, and conditions may be standardized so that the operation as a whole can be standardized and a standard time limit set for its performance.

Actual time-study procedure consists of three separate operations. *First*, we have the preliminary survey or analysis, when the engineer, without watch or other equipment, analyzes the job to familiarize himself with the general situation, and to eliminate large and outstanding faults—using the scoop shovel as it were. *Second* is the actual observation period. Here the time-study engineer



Each operation has an effect on the complete cycle.

engineer must judge, think, and observe accurately. His time-study observations and computations must be accurate if correct, standard time values are to be established.

(7) *Initiative and Optimism.* Because primarily he directs his own efforts, the time-study engineer must have initiative. He has no one to go to for definite instructions, but must work out his own problems. He must be able to see possibilities in a job long before anyone else, be able to complete his analysis, and to make recommendations for corrections or installation of a new set up. He must be a born optimist because he runs into so many pessimists and doubters that his spirit would soon be dampened.

breaks down the job into its elemental operations and subjects each operation to stop-watch analysis, recording the elapsed time of each element on the time-study form. Any delays, waits, or interruptions are also recorded on this form. In addition, all operating data and existing conditions, including a sketch of the work, are recorded at this time. *The third and final step* is made at the office where the study is summarized and the productive time is broken up into its elemental component parts, called the unit standard times. With these units, setting up a standard time allowance on a job is just a matter of arithmetic, and we have the finished product.

# An Underground Air Receiver

Unique Installation Provides Capacity for  
Peak Air Use

By R. W. NEYMAN

General Superintendent  
Hecla Mining Co.

ORIGINALLY the Star mine, owned by the Sullivan Mining Co., was developed on the upper levels, high on the mountains above Mullan, Idaho. Subsequently, and by virtue of discoveries at this elevation, arrangements were made with the Hecla Mining Co. to drive a long crosscut from the Hecla main shaft at Burke, Idaho, to further develop the Star mine at much greater depth. Accordingly a crosscut was driven into the Star tunnel approximately 10,000 ft from the Hecla 2000-ft shaft station and a raise was extended 2800 ft to connect this level with previous workings above. This crosscut is known as the Star 4000 level.

At that time the Hecla shaft and workings were served by a 6-in. air line from the main Hecla compressors on the surface. As this crosscut was extended into the Star, the 6-in. air line was also carried with it. As the Star mine development was carried on, the air lines were eventually extended to such a point that the frictional losses were almost prohibitive. An initial pressure of 105 lb was carried at the compressors on the surface, but it was found that during drilling in the Star the pressure at some of the faces dropped as low as 60 psi.

To overcome this loss of pressure a 2000 cu ft compressor was installed underground and equipped with automatic control. During the maximum demand between 9 and 11 a. m. and from noon to 1 p. m. the air pressure still dropped during these periods. To balance this pressure an air chamber was installed underground using a 9 by 10-ft crosscut approximately 750 ft long which had a capacity of 500,000 cu ft of free air. After this receiver was installed and put into operation, it was found that the air pressure could be maintained at 100 lb at all faces throughout the day, regardless of the peak periods of consumption.

In the installation of this receiver a bulkhead of reinforced concrete was placed in the crosscut and in order to be able to pass equipment through this bulkhead a door frame 4 ft wide and 6 ft high was placed in it and the opening was covered by an all-weld ribbed door. In placing the concrete the ring groove was cut 7 ft wide and

approximately 3 ft deep, the sides of which were at 45 deg from the center line of the tunnel. In cutting this ring, extreme care was used in drilling and blasting to avoid unnecessary fracturing.

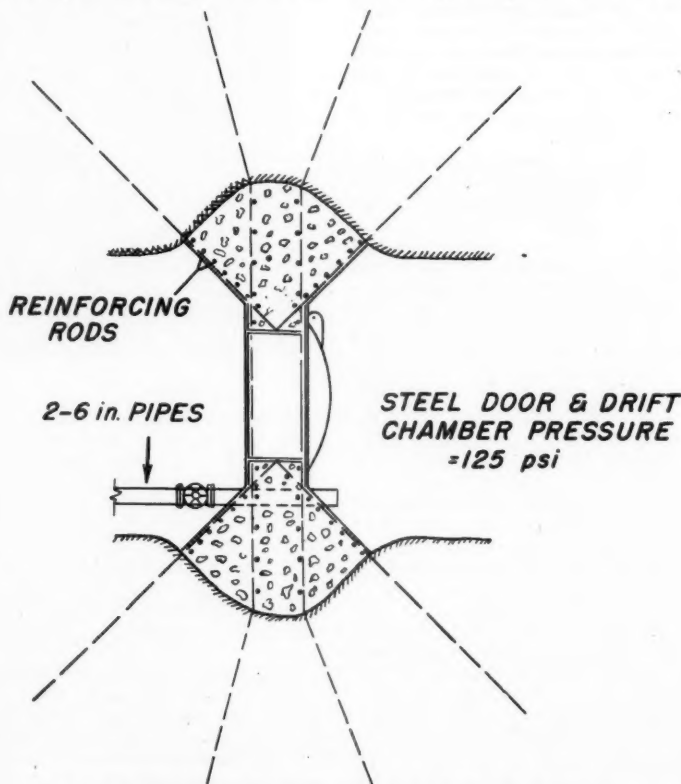
Reinforcing bars were of 1-in. square section placed 12 in. over centers both horizontally and vertically and were anchored 6 ft into solid rock. Vertical surface tension bars in the exposed faces of the bulkhead were of  $\frac{1}{4}$ -in. diam and placed 6 in. over centers.

A vertical slot was cut from the top of the bulkhead ring on the pressure side of the bulkhead to facilitate pouring the concrete. This slot was later filled after the concrete was poured. One 6-in. pipe was carried through the bulkhead about 6 ft above the track level for the air inlet and out-

let and another 6-in. line through the bulkhead below the track level serves at the drain line.

The door frame was cut from 1-in. mild steel plate. The over-all dimensions were 6-ft wide by 8-ft high and the inside dimensions were 4 ft wide by 6 ft high. The thickness of the wall and door was 24 in. It was necessary to make the door in two sections to go down the shaft and it was welded together before being placed.

In making the cover door, it was first welded and then planed in the shaper to make a true face surface for gasket. The door was an all-weld job, the cover plate of which was made of  $\frac{3}{16}$ -in. mild steel plate. The main cross supporting ribs were 12 in. oc



Plan of door installation shows ring groove holding the bulkhead.

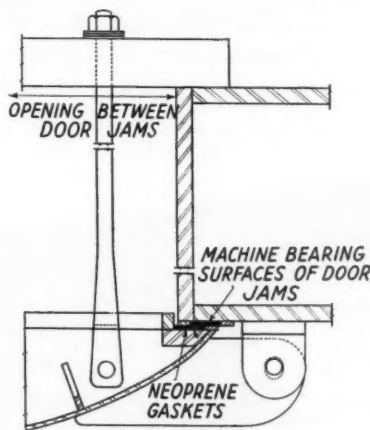


The Hecla Mining Co. has pioneered many innovations in improved practices.

and the longitudinal ribbing between these main ribs were placed 6 in. over centers. The sealing gasket was of  $\frac{1}{4}$ -in. neoprene strip which was cemented in grooves as shown in the gasket detail.

Since the door was heavy, hinges were provided to facilitate opening and closing. These hinges were fitted with loose fitting pins which were thoroughly coated with asphalt to prevent corrosion. In order to hold the door closed and give it initial pressure against the gasket, six 1-in. diameter stay bolts were provided which were hinged to the main cross ribs and were held to the door casing by suitable lugs. The final air-tight sealing was accomplished by the air pressure itself as the air was pumped into the receiver.

After the concrete bulkhead was poured, a ring of diamond drill holes was placed through the concrete and into the rock a distance of approximately 25 ft. These holes were then pumped with concrete grout until the



Detail of door joint.

high pressure check valves on the machine blew up. Twenty-five ft inside of this ring another similar ring was drilled also to 25 ft in depth and the holes in this ring were

pumped with bentonite. The purpose of this method was to first block and primarily seal any crevices around the proximity of the bulkhead with the concrete grout to form a barrier against which to pump the bentonite. The bentonite would remain plastic for sealing the smaller crevices when air under pressure was introduced. All surfaces between the door and this latter ring were thoroughly washed, wire-brushed, dried with heat and painted with asbestos-filled roofing tar. The surfaces of the bulkhead on the pressure side were also given this treatment.

The door was then tightened in place on the gaskets and the pressure brought up to 100 lb. It was found that one small leak occurred between the rock and concrete in the back of the tunnel. This was later drilled and regouted. The door has been opened twice since it was originally put under pressure and no leak has ever occurred around the gasket.

The total calculated pressure against this bulkhead was 1,600,000 lb at 125 psi, and that against the door itself was 500,000 lb at the same pressure.

In operation, the underground compressors deliver air to this receiver at full load until the air pressure reaches 110 psi, after which time the compressor unloads in stages as necessary. During peak consumption more air is drawn from the receiver than is supplied to it. Between peaks, the compressor continues at the necessary load to build the pressure back to 110 lb again. All the compressed air enters the receiver through a check valve and exhausts through a diaphragm-operated valve which automatically closes at a predetermined pressure setting. The function of this valve is to protect the receiver pressure against broken air lines which would otherwise exhaust all air from the receiver in a short time. An automatic trap keeps the water drained from the receiver where approximately  $\frac{1}{2}$  gpm collects.

## U. S. Adds Two Metals to Strategic List

Two new names—thallium and gallium—have been added to the U. S. list of rare metals of strategic importance.

Thallium, previously used only for rodent poisoning, proved its military significance during the closing days of World War II when German infra-red equipment was found with lenses and prisms containing this element.

An even rarer metal, gallium, long known to possess the highest liquid range of any known element, also became of military importance.

A survey, made at the request of the Army Engineers, resulted in the discovery of relatively large quantities of thallium in ores produced in the Salt Lake Valley, in Utah.

## Mexican Mining Industry to Convene in National Congress

Under the auspices of the Ministry of Economy, a National Mining Congress is to be convened in the City of Mexico at the Palace of Fine Arts during the week March 8-13, 1948. The attendance of all holders of mining property, metallurgical works, as well as private individuals interested in

the mining industry, are invited.

Various committees will be organized to consider mineral industry problems and make proposals which will be decided upon at general assemblies of the Congress. Legislation, fiscal matters, transportation and communication facilities, credit, co-operatives, employee-employer questions and other matters appear on the agenda of the Congress. Realizing that the mining industry is an important factor in the economy of Mexico, it is hoped that the National Mining Congress will establish policies that will be beneficial to the maximum development of the industry and the welfare of Mexico.

# **WHERE THE LOADING IS TOUGHEST... YOU'LL FIND THE WHALEY "AUTOMAT"**

*Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tippie or any lump of rock your cars, aerial tram or larries can take.*

Where the loading is toughest . . . where dependability and efficiency are equally essential for coal or rock work, experienced mine operators know they can turn to the Whaley "Automat" with complete confidence. Back of this confidence are over 40 years of experience and know-how in building loading machines exclusively for the mining industry. Back of this confidence are engineers and designers who know, first hand, the problems of mining . . . craftsmen who take a deep pride in the perfection and balance of every part that goes into the Whaley "Automat." Yes, high standards of engineering and workmanship have been responsible for the "Automat's" reputation for dependability and efficiency since 1908 when Myers-Whaley built the world's first commercially successful mechanical loader for underground work. Myers-Whaley Co., Knoxville 6, Tennessee.

# **MYERS- WHALEY**



*Mechanical Loaders Exclusively for Over 40 Years*



# Grounding Off-Track Mining Equipment

A Report of the Power Committee Recommending Methods and Procedures for Grounding the Frames of Direct Current Portable Machines Used Underground

Submitted by  
Subcommittee on Grounding  
D. E. RENSHAW, *Chairman*

**T**HE grounding of the frames or enclosures of stationary or permanently mounted electric machines and devices is a standard safety practice in all industries, including coal mining. Industry, in general, also follows the practice of grounding the frames of portable electric machines. In coal mining, small portable machines, such as hand-held or post-mounted electric drills, are practically always frame grounded. However, there is sharp disagreement regarding the over-all or net benefits obtained by grounding the frames of larger machines, such as loaders, cutters and shuttle cars, which generally require longer and larger cables. Because of this disagreement, the Committee on Underground Power has undertaken the study of the subject:

"Frame Grounding of Off-Track Direct-Current Equipment Underground." This report is intended to present fairly the merits and demerits of frame grounding and to present the recommendations of the committee.

In this study the committee has, no doubt, been influenced by the regulations which have been established by competent authorities.

The National Electrical Code and the National Electrical Safety Code require the safety grounding of the frames of portable equipment, specific mention being made of equipment used in hazardous locations, such as places where combustible dust or flammable gas may be suspended or diffused in the air.

The U. S. Bureau of Mines Sched-

THIS IS A  
COAL DIVISION  
REPORT

ule 2E covering permissible equipment requires frame grounding of stationary, semi-portable, and portable machines.

The Federal Mine Safety Code calls for the grounding of metal conduit, metallic coverings and armor of cable, metallic frames, casing and other electric equipment, casings of transformers, and mining equipment mounted on rubber tires or caterpillar treads.

In at least five states of this country, safety grounding is required by law, and most coal-mining departments of the other coal-producing states either require or recommend it.

## Definitions

In this report, the term "positive," as applied to conductor polarity, refers to the conductor which is insulated from earth throughout its length; that is, the conductor which is ungrounded.

Similarly, the term "negative" re-



Face operations in low coal must be protected.

fers to the conductor which is connected to earth at the source of direct current power and, usually, at other points.

Therefore, the terms "positive" and "negative," as applied to conductor polarity, refer to the *normally* grounded or ungrounded condition of the conductors, not necessarily to the actual polarity of the conductor.

The terms "safety ground conductor" and "grounding conductor" refer to a metallic conductor of proper size, which is connected to the machine frame and to a feeder conductor which is at ground potential. Normally, the grounding conductor does not carry current, and both ends of this conductor, including the machine frame, are at ground potential.

For the purposes of this report, a continuous well-bonded track is considered to be at "ground potential." Similarly, a negative conductor, which is connected to earth mass through low-resistance contacts, is considered to be at "ground potential."

"Portable" equipment includes semi-stationary equipment, such as conveyors, hand-held or post-mounted drills, and any machines that are regularly and frequently moved from place to place in the normal operating cycle.

"Mobile" equipment includes self-propelled machines such as loaders, cutters, and shuttle cars.

A "trailing cable" contains the power supply conductors to a portable or mobile machine. The inby end of the trailing cable is attached to terminals in the machine. The outby end is attached to semi-stationary terminals, as in a distribution box, or to fixed conductors, such as trolley and rail. A trailing cable may be spooled on a cable reel or may be handled manually as the machine moves into and out of working places.

A "portable cable" is one which is not fixed in position nor is it attached to a machine which frequently and regularly moves from place to place. It is used to carry power from a fixed point, such as trolley and rail, to a

movable point such as a distribution box. A portable cable may be continuous, or it may be sectionalized by use of suitable connectors or splice boxes.

## Advantages of Machine Grounding

It should be understood that a safety ground conductor, in itself, is not a complete guarantee against any hazard. It will **REDUCE** or **MINIMIZE** the dangers which result from electrical insulation failures and may be used, in conjunction with protective equipment, to isolate a point of failure from the power supply.

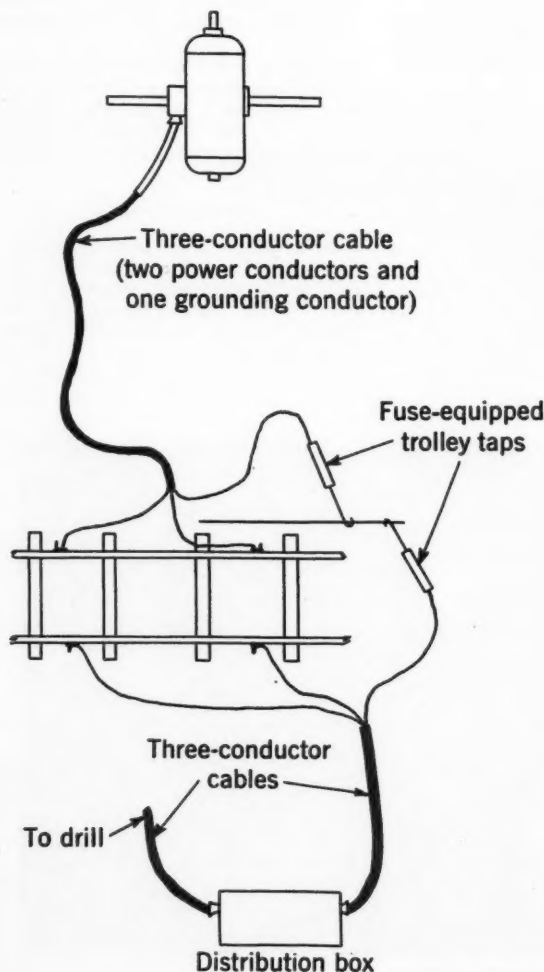
The principal reasons for use of the safety ground conductor are as follows:

(1) To **Reduce** the shock hazard to personnel.

When an insulation failure occurs in a motor or starter, the enclosure of the motor or starter and the complete machine on which the motor or starter is mounted may be placed at a potential different from ground potential. The safety ground conductor, by reducing circuit resistance to ground, facilitates the operation of overcurrent protective devices. And, by providing a low resistance path to ground, the ground conductor reduces the potential difference between ground and machine, proportionally reducing the shock hazard.

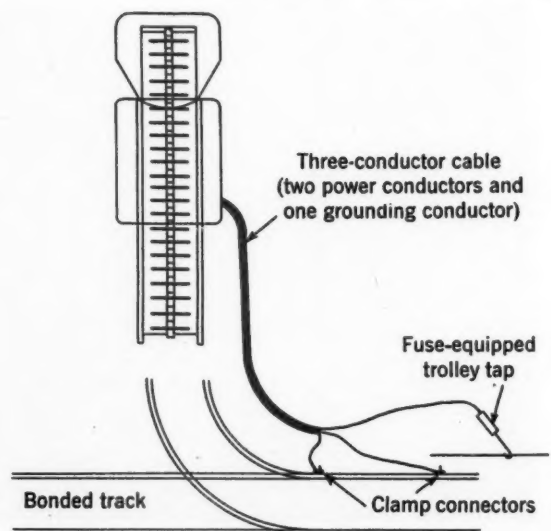
If a machine is operated with both positive and negative conductors normally insulated from the machine frame and *without* a grounding conductor, a failure from positive to frame may not interfere with machine operation, but it may place the machine frame at line potential above ground.

If a machine is "grounded" by connecting the negative conductor to the machine frame, without a grounding



Left: Grounding for hand-held or post drill.

Below: Grounding for tractor-mounted mechanical loader.



conductor, whenever the machine is operating, the machine frame will be above ground potential by the amount of the voltage drop in the negative conductor. If the negative is insulated and the grounding conductor is used, the machine frame will normally be held at ground potential.

(2) To drain off static charges.

There is a possibility of static charges of electricity being built up on metal coal chutes; on shuttle cars; on belts of belt conveyors, metal nozzles or rubberized rock-dusting or compressed-air tubing; metal insulated parts of vent-tubing, and metal plates which are insulated from their surroundings and exposed to a high velocity air current. A grounding conductor will continuously drain off such charges, preventing a spark discharge, which might be shocking or incendive.

(3) To Reduce stray currents.

By providing a low resistance path for current flow to the negative conductor, the safety ground conductor will reduce stray current flow over equipment and in the mine floor. Such stray currents might ignite combustibles and explosives.

(4) To detect and isolate insulation failures.

Except for stray currents, the safety ground conductor carries current only in case of an insulation failure in a cable, control device, or motor. When such a failure occurs and current flows in the safety ground conductor, this current may be used to operate a current relay or trip device which will open a breaker or a contactor to isolate the circuit. This arrangement provides continuous ground fault detection and makes certain that no machine will be operated when its insulation is defective.

## Discussion Against Frame Grounding

(1) The cost of trailing cable is increased.

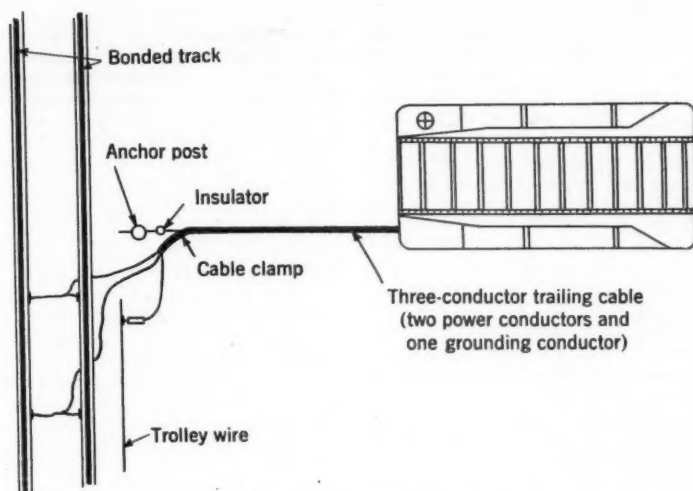
This is true. However, if the safety ground eliminates any accidents, the extra cost may be well justified.

(2) The weight of trailing cable is increased, making it more difficult to handle.

(3) The over-all size of the trailing cable is increased.

This requires either that the length of cable spooled on a reel be decreased, or that smaller conductors be used. A decrease in length of trailing cable may require a change in mining methods and an increase in cost of operation.

Smaller conductors would involve increased conductor heating and voltage drop, and would usually be impractical. However, recently developed cable with a grounding conductor is not much larger than two-conductor cable. This does not invalidate the claim, but reduces its importance.



Grounding for rubber-tired shuttle car.

(4) Splicing of a three-conductor cable is more difficult than splicing a two-conductor cable.

Temporary splices are made, and will be made by machine operators, who are not skilled electricians. Such splices in a two-conductor cable are frequently poor, and splices in a three-conductor cable will be poorer. Splice failures will interfere with operation and may cause mine fires. Possibly, damaged cables should be replaced, and temporary splices should not be permitted. This, of course, is not present common practice. (Note: See discussion following this report on page 56.)

(5) With a motor or controller frame solidly grounded, the severity of arcing incident to insulation failure may be increased to the extent that a hole may be burned through a machine casing to the atmosphere.

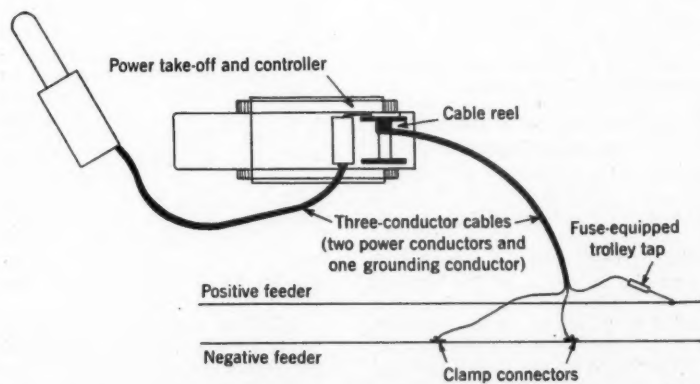
An arc of sufficient intensity and duration to burn through a heavy explosion-proof casing could exist only if overcurrent protective devices are nonexistent or inoperative. The safety

ground conductor is not intended to and will not compensate for inadequate maintenance or for a lack of adequate overcurrent protection.

(6) In case of a complete break in the negative conductor outby the point at which the trailing cable or portable cable is attached to the power feeders (negative and positive), the closing of a controller or any machine inby the break may place full line potential on the frames of all machines inby the break which are equipped with safety ground conductors.

This is definitely a hazard which is introduced by the safety ground conductor. However, it must be agreed that this is not a common occurrence, nor will this fault condition persist for long because machines will not operate with one side of the power supply circuit open.

If the supply circuit is a cable, it is improbable that the negative will be broken while the positive conductor remains intact. If the supply circuit consists of trolley and rails, the con-



Grounding for shortwall cutting machine.



dition cited above can be produced by closing the controller of a locomotive in by a complete break in the rail circuit.

In that case, the locomotive, the track, and all equipment on the track are at line potential, if the track is completely insulated from earth. Actually, insulating the track from earth is difficult under conditions existing in most mines.

(7) The safety ground conductor encourages insulation failure because it places full line voltage stress on all insulation.

This would be important if it were possible to keep machine frames ungrounded at all times. However, practically every mining machine comes into contact with a well-grounded conducting body repeatedly in the normal course of operation. If the insulation is weak, it will break down at that time. Track-mounted machine frames are grounded continuously, and there appears to be no good reason why off-track equipment cannot be grounded continuously.

(8) The electric shock hazard is not great enough to warrant safety grounding, because accident statistics do not show sufficient accident frequency to justify the added operating difficulties.

Relatively few of the electric shocks received from machine frames are of sufficient severity to cause direct injury or death. However, an electric shock may throw a person off guard and his reaction may throw him into the path of moving equipment. There are records of a number of serious injuries and deaths which resulted directly or indirectly from this type of electric shock.

(9) If two machines in a working place are both equipped with safety ground conductors, one of which is accidentally in contact with the negative conductor in the machine, when the machines in operation touch each other there will be a spark at the point of contact. Since this takes place at or near the face where gas or dust accumulations are most likely to occur, an explosion might result.

This possibility can be eliminated by the use of a tripping device in the safety ground conductor, which would cut off power on the machine in which the insulation failure exists.

### Conclusions and Recommendations

It is readily agreed by all persons who have studied the subject that the safety ground conductor has merits and disadvantages. There is disagreement regarding the severity of, or even the existence of the hazards which the safety ground conductor is intended to minimize or to eliminate, and as to whether or not the benefits are outweighed by the added cost and general undesirability of the third conductor in a trailing cable.

The Committee on Underground Power has studied and debated the items enumerated above and has reached the conclusions stated in the following recommendations. It should not be considered that the subject is closed with this report. Additional experience or new developments may call for different conclusions and different recommendations. The committee will reconsider the subject at any time it seems desirable to do so. The committee recommends that:

(1) The metallic frames and casings of electric equipment that can become "alive" through failure of insulation or by contact with energized parts should be grounded effectively by means of a safety ground conductor.

(2) Semi-portable machines which are essentially stationary, such as room hoists, pumps, conveyors, etc., should be grounded effectively by means of a safety ground conductor.

(3) The frames of mining machines, conveyors, shuttle cars, and other mobile or portable equipment as in conveyor or shuttle-car mining, should be effectively grounded by means of a safety ground conductor.

(4) The frames of mining machines regularly transported on separate trucks should be electrically connected to the truck frames by means of a safety ground conductor if power connections are made to the trucks. If power connections are not made to the trucks, provision for grounding should be the same as for other machines not transported on separate trucks, as in paragraph (3) above.

(5) The frames of drills and other electrically operated tools intended to be held in the hands or supported against the body while in use should be effectively grounded. The cable to such equipment should have a grounding conductor in addition to the power conductors.

(6) Splice boxes, junction boxes, and distribution boxes should be grounded adequately. It is recommended that this equipment be grounded by means of an additional conductor (grounding conductor) in the trailing cables, and the frames of machines receiving power from distribution boxes should be electrically connected thereto by an additional conductor in the trailing cables.

(7) Grounding connections to track or other grounding medium should be independent of the power connections.

(8) The power conductors in trailing cables should not be used for grounding.

(9) If the power conductors are No. 6, B and S gauge, or larger,

the grounding conductor shall be not less than 50 per cent of the cross sectional area of the power conductors, and not smaller than No. 8. If the power conductors are smaller than No. 6, the grounding conductors shall not be smaller than the power conductors.

(10) On grounding systems employing automatic ground-fault tripping devices, means should be provided to remove power completely from the affected circuit (both positive and negative) when a ground fault occurs. (This is a safety precaution to prevent the flow of fault current over the conductors in the event the faulted machine were to contact another machine. Under some conditions, it may be necessary to open the positive, the negative, and the safety ground conductor to prevent the flow of current from the frame of a faulted machine to the frame of another machine when the two machines are in contact.)

(11) Grounding conductor should have sufficient current-carrying capacity to operate circuit-breaking devices. It should do this without overheating any part of the connection and be strong enough mechanically to withstand the stress of abuse to which it may be subjected.

### — Discussion —

THE foregoing report as approved by the Committee on Underground Power was presented by D. E. Renshaw at the Annual Conference of the Coal Division in Pittsburgh on November 18. Following the presentation, there was considerable discussion on a sentence in the report relative to splices on trailing cables which says "... possibly temporary splices should not be permitted"; an extract of this discussion is given below. (See page 55.)

**Richard Maize:** I believe that only one temporary splice should be permitted on a cable. The machine operator should be allowed to make a splice to finish his day's work, then that particular cable should be sent outside to be vulcanized in a vulcanizing machine by a man who thoroughly understands the job. This is the only safe way to repair trailing cables; you just cannot permit a machine runner to put in an indefinite number of splices. And even with vulcanizing, some coal companies have a fixed limit of five splices that they will permit on a trailing cable before it is discarded.

In considering the number of splices permissible on a trailing cable, we must remember that when we have the first failure, there may be a number of other weak spots develop in the cable at the same time; however, the weakest spot fails first. Almost invariably, one never takes a cable off

unless it has a failure; until then it will be kept in operation indefinitely. The chance of a failure at the splice is not as great as at some other place; but the fact that a failure has occurred indicates a danger or weakness in the cable and it should be replaced. In other words, a careful machine operator can make a temporary splice which will permit him to finish his day's work, but he may have failures during that day at some other place on the cable.

One must use some judgment in deciding when a trailing cable should be discarded, and there is no denying that you will have a greater degree of safety with each new cable you install than you have with an old cable which has been in operation for several months or probably a year. However, we must not lose sight of the fact that the mines must produce coal and while there is no person in the United States more safety conscious than myself, I still appreciate the difficulty that operators are having who are conscientiously trying to work their mines safely.

**T. R. Weichel:** I have had the opportunity of visiting two mines in West Virginia that are perhaps the most gassy in the country, and are operated with storage battery equipment, some of which use trailing cables. It is surprising to note the "safety-conscious" spirit of the workmen at these mines. If anything is wrong with a machine or cable, it is reported immediately to the foreman. In the case of a faulted cable, it is removed from service and replaced by a standby; temporary splices are not permitted. This of course involves replacements; sometimes it is necessary to remove a machine from a working place and replace it with another unit until permanent repairs have been made. Nevertheless, these mines might have not worked safely as long as they have if the company officials and workmen had not been "safety conscious."

I found no temporary cable splices in either of these mines at the time of my visit. That is the practice we all hope to obtain some day, and possibly we can eventually succeed in limiting the number of temporary splices permitted in a trailing cable. This is an item worthy of consideration in the future.

**C. C. Conway:** The practice described by Mr. Weichel, of operating no piece of equipment that has a temporarily spliced cable, is something that could easily be abused, because the mere blowing of a cable could cause a delay of the major portion of a working shift. You can't change a cable on mining machinery in a few minutes' time, particularly if that equipment is equipped with a cable reel. I think that there is a need for suitable connectors, particularly for use with cable reels, to speed up the

time required to change cables. In any event, I would like to exercise the privilege mentioned by Mr. Maize, of finishing the day before changing a damaged cable; certainly a temporary splice should be good for one day's operation.

**R. Gehlsen:** I think everyone would like to take a cable off after the first failure if it didn't cost anything, but as you know, an operator must make his mining project a financial success. He will be reluctant to shut down a \$20,000 cutting machine because of a damaged cable, and to incur an unreasonable amount of lost time when a cable failure occurs. I understand it takes six to eight hours to get a damaged cable off of certain types of mining machines and connect up a good one. Of course, there are other machines where the cable change time is probably in the neighborhood of two or three hours. I would like to add that design work is in progress to create a set of connectors at the reel

Some time ago we had an experience with a failure on a ground-wire type of cable which had been in service only a short time. I made an examination and found that, at the point of failure, the ground conductor had arced through the jacket sufficiently to burn a knob on the end of a broken wire. That could indicate only one condition—that there was a difference of potential between the outside of the jacket and the uninsulated ground wire and also that there had been sufficient current to establish an arc.

The question then is what conditions could exist to cause a difference of potential between the ground wire and the outside of the jacket or earth. As I see it, if the ground wire is not properly connected to the rail or other ground and while in this condition, if an accidental fault occurs on the machine, there is no means of draining off the current to the earth. Therefore, the potential of the machine frame



Adequate returns needed for rubber-tire mounting.

end of a cable reel machine; we are attempting such a design to be incorporated in a cable reel and to be federally approved.

Going back for a moment to vulcanizing, the manufacturers of rubber tape for use with vulcanizers have been unable to create a synthetic tape, such as Neoprene, that would last at least six months in storage. Up to now we have been using a rubber tape for vulcanizing cables which is not flame resistant, but which has been approved tentatively, until a new synthetic tape could be developed. We now have such a Neoprene tape which will stand six months storage. It will come in dated cartons—a procedure similar to that used for camera film which are always given a time limit.

**C. E. Wissinger:** Prompt and proper splicing of trailing cables is very important, but there is another question to consider, relative to grounding.

risers and the ground wire, being properly connected to the machine frame, would naturally assume the same potential as the frame. Since the ground wire is uninsulated and the jacket which surrounds it does not have high insulating properties, it naturally follows that a failure would take place between the ground conductor and the weakest point in the cable or the place where the cable jacket had the best contact with the earth. This could be at a place where the cable was lying in water or where it crossed the rail or other grounded object.

Should such a failure occur where there is gas, the results could be disastrous. I am describing this experience to emphasize the importance of properly connecting the ground wire to a good dependable earth connection, as an improperly installed ground wire can be a detriment instead of a protection.



An entire floor is devoted to bowling.

## Butte Boasts Exceptional Employees Club

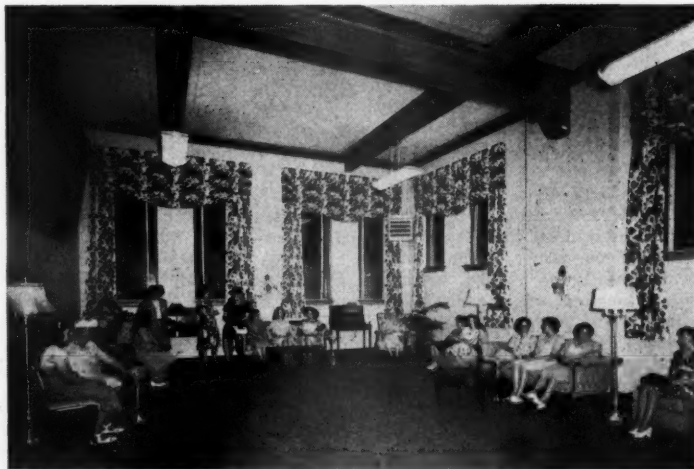
**Recognizing the Need of Its Employees for a Centrally Located Recreational Area Where Planned Social Functions Could Be Held, the Anaconda Copper Mining Co. Provided an Unusually Well-equipped and Furnished Building for Employees and Their Families.**

**B**UTTE, the "richest hill on earth," rightfully boasts owning one of the finest social and recreational centers in the nation—the Anaconda Copper Mining Co. Employees Club. The club is for the convenience and enjoyment of the company's 6000 employees in the Butte area.

Housed in a five-story building, the club is located in the heart of the city. Some 16,000 Butte employees and members of their families visited the club on opening day, March 16, 1947. The average daily attendance is 1000. All Butte employees of the company are members; wives or husbands of employees are associate members. In all, the club has a membership of over 10,000, which makes it the largest social-recreational club west of the Mississippi River. The club is open seven days a week from noon to midnight. Its operation, as deter-

mined by the company, is on a "no dues" basis. Maintenance of the club is also underwritten by the company. A staff of 20 is employed to maintain the building and keep furnishings and recreational equipment in top-notch condition. Butte takes justifiable pride in this outstanding institution.

When the ACM Co. engineering staff redesigned the entire building, under



For the ladies—their own well-equipped lounge.



the direction of C. D. Woodward, chief engineer in the mechanical and engineering department, every thought was given to the use of the former hotel as a recreational center. The club building is air conditioned throughout and is centrally heated.

A board of seven directors govern the club. Representation on the board is as follows: Underground operations, two; crafts, hoisting and compressor plants, administrative clerical, subsidiary companies, and management, one each. All of the groups have representation on the board at all times and the club officers are elected by the board from its membership.

On the ground floor there is a main lounge, a women's lounge, a snack bar, and a large assembly hall called the Crystal Room. The main lounge, with its high-beamed ceiling and numerous windows, comfortable furnishings, and effective lighting, is planned to blend attractiveness with comfort. Oil paintings by Montana artists add to the charm of the room.

Many members regard the women's lounge as the most attractive section of the club. The decorators missed nothing in furnishing the room with carpeting, furniture, drapes, lamps, and overhead lighting to blend with each other in good taste.

A dozen crystal glassed pillars, running from the floor to the high ceiling, give the Crystal Room its name. The room has stage and screen facilities and is the scene of dances, shows, movies, flower shows, cooking schools, stag parties, and lectures. A seating capacity for 500 persons ensures freedom from overcrowding. A snack bar serves sandwiches, salads, and fountain dishes. An electric kitchen, equipped with warming tables is used when large parties are held and cooked food is served by a Butte caterer.

The mezzanine floor overlooking the



The club is the scene of many off-duty pleasant hours.

Crystal Room offers a combination lounge and card room. Copper flower boxes rest on the ledges of block glass windows. An entire floor devoted to bowling, is provided with the best equipment available.

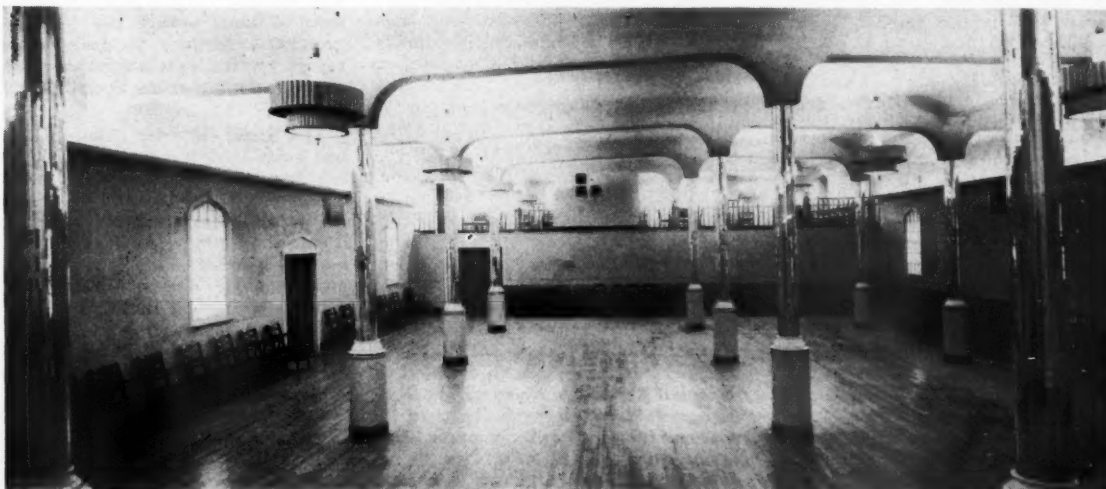
A large beer bar, a pool-billiard room, and a game room are located on one floor. The beer bar is a spacious room equipped with serving tables and some 15 card tables. The card tables, specimens of the craftsmen's art, were made at the company shops.

During the month of July, members escorted upwards of 1000 out-of-town guests through the club. Visitors' remarks in the guest book are all highly complimentary, running from "excellent," to "the real McCoy."

Officers and directors of the club are: Oscar Hills of the underground

workers' group, president; Richard Leary, a machinist, vice president; Fred Strandberg, an engineer, secretary. Board members are: Neal Shea of the underground workers; Harry Oates of the hoisting and compression division; Matt F. Martinich, lumber-yard foreman, and Eugene Hogan, assistant general superintendent of mines. In the club Joe L. Markham is managing director, John Good is manager, and Lloyd Crippen is assistant manager. The managing director, manager, and assistant manager are long-time employees of the company, as are a majority of the club staff.

After a year's operation the club continues to gain in popularity. The average monthly door count is 21,000. Both the company and employees are proud of the success of the club.



In the Crystal Room, dances, shows, movies and other well-attended events take place.

# WHEELS OF GOVERNMENT

As Viewed by A. W. DICKINSON of the American Mining Congress

**C**URRENT attention in the Congress centers on the European Recovery Program (Marshall Plan) now under debate on the Senate floor. Otherwise both House and Senate are driving ahead on the annual departmental supply bills and pointing their program at an early adjournment in this campaign year.

The European Recovery measure provides for U. S. participation for approximately a 4-year period, with authorized expenditures for the first 12 months of \$5.3 billion, one billion of which may be advanced by the RFC pending congressional action on appropriations. The assistance contemplated, involving both loans and grants, would not be confined to relief commodities; the announced objective being to help European nations to help themselves to recovery in such a way as to become independent of outside assistance. An Economic Cooperation Administration, headed by an Administrator, would be established to administer the program at home and abroad. Except for liquidation purposes, the program will terminate on June 30, 1952. Meanwhile, the President has asked for a further \$570 million for aid to China until June 30, 1949.

## Taxes

Senator Millikin's (Rep., Colo.), Finance Committee is now conducting hearings on the \$6.3 billion individual income tax reduction bill which passed the House, February 2. It is anticipated that the bill, when sent to the White House, will carry an over-all reduction approximating \$5 billion. Treasury Secretary Snyder in his testimony before the committee threw cold water on tax reduction, and Budget Director Webb made reference to uncertain world conditions and stated that the budget for 1950 will undoubtedly be large.

Meanwhile, the House Committee on Ways and Means has directed the drafting of a further tax bill which is expected to carry certain needed

adjustments and clarifications of some of the administrative provisions of the revenue laws.

## Economic Controls

Activities of the Senate Banking and Currency Committee on Economic Control measures, discussed in the February issue, have been indefinitely postponed by Chairman Tobey (Rep., N. H.). In announcing this decision Tobey said that the break in the commodity and security markets in mid-February had determined the committee's policy to go slow on any measure to restore rationing, price and wage controls. Press announcements of an increase in steel prices turned out to be a "tempest in a teapot" attributable to incomplete information.

## Trade Agreements

A White House message to Congress has called for extension of the Reciprocal Foreign Trade Agreements authority to June 12, 1951—three years. It is well-known that a majority of the members of the House and Senate regard the Administration's trade agreement program very critically. There is, however, not much time for the Congress to go into an extensive overhauling of the law, and it is regarded as probable that it may be extended in its present form for not to exceed one year, in anticipation of a definite change in policy and practice in the 81st Congress.

## Social Security

Early Senate action is expected on Representative Gearhart's (Rep., Calif.) H. J. Res. 296, which would maintain the status quo of social security pay-roll taxes with respect to independent contractors, despite the proposed new regulations of the Bureau of Internal Revenue discussed in previous issues. The House passed the resolution by a vote of 314 to 36 on February 27, and although a White House veto is anticipated, there is a

\*\*\*\*\*

## Washington Highlights

**CONGRESS:** Speeds disposal of bills.

**TAXES:** Substantial cut in prospect.

**ECONOMIC CONTROLS:** Action deferred.

**TRADE AGREEMENTS:** Act may get brief extension.

**INDEPENDENT CONTRACTORS:** House approves Gearhart bill.

**USES—EMPLOYMENT SECURITY:** House rejects President's Plan.

**UMWA PENSIONS:** Discussion renewed.

**ST. LAWRENCE:** Bill defeated.

**INDIAN RESERVATIONS:** Alaska miners oppose.

\*\*\*\*\*

possibility that the Senate may be able to muster enough votes to override such a veto.

Ways and Means Subcommittee hearings under Representative Dan Reed (Rep., N. Y.) are announced on social security immediately following the submission of a report by the Advisory Council, headed by Edward R. Stettinius. This Council was appointed by Finance Committee Chairman Millikin during the 1947 congressional session, to examine and report on the over-all establishment and functioning of the Social Security System.

The Social Security Administration has submitted recommendations calling for establishment of a Federal compulsory insurance program covering medical care and loss of wages because of illness; coverage of all gainful workers, including farmers and domestic and public employees, under old-age and survivors' insurance; increase in monthly benefit payments and reduction of pension age for women from 65 to 60 years; application of the social security tax to larger amounts of annual earnings than the first \$3000; a national benefit formula of \$25 for 26 weeks for unemployment compensation, limitation of disqualification provisions, and

changes in the methods of financing unemployment compensation.

### USES—Employment Security

The White House Reorganization Plan to transfer USES and the Bureau of Employment Security to the Department of Labor was rejected by the House on February 25. The action was taken by approval of Representative Hoffman's H. Con. Res. 131 by a voice vote. A Senate Labor and Public Welfare subcommittee under Senator Ball (Rep., Minn.) has conducted hearings on the rejection resolution and early action is anticipated as the Reorganization Plan must be rejected by March 19, or else it will become effective.

The rejection resolution was strongly endorsed by Secretary Julian D. Conover of the American Mining Congress, who stated to the committee that it would be a serious mistake to transfer the USES and the Bureau of Employment Security from the officially neutral Federal Security Agency to the officially partisan Department of Labor. He emphasized that the functions of both agencies are of concern not only to labor but to employers and the public generally. He urged that both agencies be coordinated under a single head in the Federal Security Agency, which handles all other phases of social security.

Conover pointed out that Congress has consistently refused to place the unemployment compensation program under Federal control and that the Congress had also returned the employment services to the states in November 1946 over the protest of the Department of Labor. He emphasized that no move should now be made to inject a greater tendency toward Federal dictation into these important activities of the states, and recommended that Congress defer action on any reorganization plan until after the report of the Hoover Commission, which is actively studying the current organization of the Federal executive departments and agencies.

### UMWA Pensions

No word has come from the informal meetings of coal mine operator and UMWA representatives in late February. It was reported that the mine workers' leader had called for further discussion of his proposal of a \$100 monthly pension for each miner 60 years of age who has worked 20 years in the mines. The mine workers have filed no notice of intention to terminate their contract on the basis of a major dispute affecting the national interest.

Operators conferring in Washington included: Ezra Van Horn, Charles O'Neill, Harry M. Moses, T. G. Gerow,

Joseph E. Moody, George Thursby, J. B. Morrow, Harvey Cartwright, I. N. Bayless, George H. Love, Paul L. Shields, Heath S. Clark, Harry Crichton, J. William Wetter, T. E. Johnson, E. H. Davis, George S. Brackett, B. P. Manley, A. R. Long, Martin L. Markle, Frank Amos, John Corcoran, William Foster, and Frank G. Smith.

### St. Lawrence Project Shelved

On motion of Senator H. Alexander Smith (Rep., N. J.) on February 27, the Great Lakes-St. Lawrence Seaway and Power Project resolution was sent back to the Foreign Relations Committee for "further study" by a Senate vote of 57 to 30. This controversial issue has thus been once more laid to rest. The floor debate was prolonged as Senator after Senator criticized the arguments of advocates of the project as a national defense measure.

### Alaska-Indian Reservations

The Senate Committee on Interior and Insular Affairs (formerly Committee on Public Lands) has con-

ducted extended hearings on the resolution introduced last fall by its chairman, Senator Butler of Nebraska, to rescind orders of the Secretary of the Interior, establishing Indian reservations in Alaska. Members of the Alaska Miners Association have repeatedly asserted that the needless withdrawal of large land areas has seriously hampered expansion of the mining and lumbering industries.

The Alaska Miners Association president, James K. Crowdy, testified in support of the resolution, stating that the wholesale establishment of Indian reservations is unnecessary and is retarding progress and development because no one can risk heavy investments under present conditions.

The resolution would also clarify the question of "aboriginal titles" by stating that these alleged titles were extinguished under the terms of the treaty of June 20, 1867, between the U. S. and Russia, and that the U. S. has never recognized rights of natives based upon use and occupancy except to the extent that certain individual rights have been recognized in the case of natives in the same manner as in the case of other citizens.

### "Nothing Is Certain But Death And Taxes"





# Personals

**Clark L. Wilson** has been made superintendent of New Park Mining Co., Park City, Utah. **John H. Cone** is assistant superintendent; **F. A. Kuhlman**, mine engineer, and **R. E. Gilbert**, geologist.

**S. J. Craighead**, former superintendent of the Robena Mine of H. C. Frick Coke Co., has been appointed vice-president and general manager of the United States Fuel Co. of Utah, with headquarters at Salt Lake City.

**Howard Kegley** has been elected president of the Mining Assn. of the Southwest for the 1948 term. Other officers elected to serve during the current year include **H. W. Howe**, vice president; **John Herman**, second vice president; and **Victor J. Hayek**, secretary.

**C. M. Spencer** has been appointed to the position of assistant sales agent for the Delaware, Lackawanna & Western Coal Co., according to an announcement made by **R. F. Duemler**, vice president and general sales agent of the company.

**Howard I. Young**, President, The American Mining Congress and president, American Zinc, Lead and Smelting Co., has been elected to membership on the board of directors of the General American Life Insurance Co. at St. Louis, Mo.

**J. A. Younkins** is now general superintendent of the Truax-Traer Coal Co. He was formerly assistant general superintendent with the Duquesne Light Co.

The St. Joseph Lead Co. announced the appointment of **Harry E. Outcault** as manager, zinc oxide sales. Mr. Outcault has been associated with the company since 1931, when their new electro-thermic zinc oxide plant went into production. He served as manager of technical service and more recently as assistant sales manager. Prior to that time he was associated with the New Jersey Zinc Co.

**Roy A. Ison** has been promoted to the position of assistant general manager with the Red Jacket Coal Corp.

**Manfred Bowditch**, formerly field director of the Saranac Laboratory and director of the Division of Occupational Hygiene of the Department of Labor and Industries of the Commonwealth of Massachusetts, has been appointed to the position of director of health and safety of the Lead Industries Assn.

**Forbes S. Robertson** of Rolla, Mo., has joined the faculty of Montana School of Mines, and will teach petrography, economic geology, and related subjects during the school year, and do other work for the Montana Bureau of Mines and Geology during the summer months. Before coming to Butte he was economic geologist for the Missouri Geological Survey.

**A. "Andy" F. Whitt**, chief engineer of the Rail and River Coal Co., a subsidiary of the Canadian National Railways, resigned effective Feb. 1, and has accepted a position as general



manager of the Pyramid Coal Mining Co. of Terre Haute, Ind. Mr. Whitt came up through the engineering department of the West Virginia Coal & Coke Corp., where he served for a number of years as general superintendent. Leaving this employment he was in charge of mines for the Lillybrook Coal Co., and devoted a great deal of his efforts to Affinity and Big Stick mines in the Beckley Field.

**F. M. Murphy** has resigned his position as geologist with the Union Pacific Railroad Co. in Los Angeles in order to establish a consulting practice in Las Vegas, Nev.

**J. J. Beeson**, consulting mining engineer and geologist, formerly with the Premium Price Plan in Washington, D. C., has resumed his consulting practice with headquarters in the Dooly Building, Salt Lake City.

**Mayer G. Hansen**, widely known mining geologist, has accepted the position of sales manager for E. J. Longyear Company. He leaves Salt Lake City where he was directing exploration activities for Newmont Mining Corporation.

Due to expansion of shaft sinking activities in its Mining Division, Longyear has also appointed **Robert L. Loofbourow** to the position of mining engineer in this department. During the last fifteen months he has had charge of sales for the Company.

**Roy Golden**, formerly associated with the Lillybrook Coal Co., has joined the staff of the Imperial Smokeless Coal Co. as chief electrician at the No. 2 mine. **Estil Gunter** has resigned his former position as general mine foreman at Kopperston, to become mechanization foreman at Imperial. **W. L. Carneal**, general night foreman at No. 2 mine, has been transferred to No. 3 mine as general foreman. **Guy Beavers**, formerly night electrician at Mine No. 2, has been appointed chief electrician at Mine No. 3, and **H. A. Withrow** has been made general night foreman.

**Roy M. Hammond** and **Walter F. Everly** are now engaged in consulting mining engineering work in addition to carrying on assay work in Butte. They were formerly associated with the Richard McCarthy assay office.

**Dr. A. W. Gauger**, director of Pennsylvania State College, delivered an address before the Stoker Institute of Canada on the occasion of their annual banquet. Dr. Gauger expressed the hope that experiments in coal combustion will lead to higher efficiency and utilization of a wider range of coal.

**George M. Humphrey**, president of the M. A. Hanna Co., has been named by President Truman as a representative of management on a joint labor-management panel assisting Cyrus Ching, director of the new Federal Mediation and Conciliation Service.

**C. E. McGlaughlin** has been appointed special representative for Bituminous Coal Research, Inc., to maintain contact with its members and prospective members. He succeeds **T. A. Day**, who recently joined the Bituminous Coal Institute.

**Thomas McNally**, president of the McNally-Pittsburg Mfg. Corp., has been presented for consideration as national director to the Chamber of Commerce of the United States from District 7. This district includes Missouri, Kansas, Oklahoma, Arkansas, Louisiana and Texas.

George W. Rudolf Schreiber has been elected president of the Ore & Chemical Corp., succeeding Hans Bernstorff. Formerly Mr. Schreiber had been vice president of the corporation. The principal activities of the Ore & Chemical Co. are import and export business in ferrous and non-ferrous ores, alloys, metals and chemicals.

J. B. Morrow has been elected to the post of board chairman of the Pittsburgh Coal Co. G. A. Shoemaker is president and Henry Rose vice president.

Arthur J. Weinig, Jr., was recently promoted to the position of superintendent of the refinery at the plant of the Potash Co. of America at Carlsbad, N. Mex.

Sherman S. Watkins has resigned as district manager, Koppers Co., Inc., wood-preserving division, and has opened his office as a timber consultant in wood preservation and in the use of timber with special reference to coal mining service. His office is located at 102 Front St., Marietta, Ohio.

Charles B. E. Douglas, consulting mining engineer for the United States Smelting Refining & Mining Co., has been transferred to the Salt Lake City headquarters from his former post with the Compania De Real del Monte y Pachuca, in Mexico.

H. A. Berh, president of Woodward Iron Co. since 1933, retired on Feb. 12, 1948. Succeeding him is Bradford C. Colcord who comes from the superintendency of the Lorain Plant of National Tube Co. Appointed to the vice presidency is Hewitt Smith, general superintendent of mines.

Allan M. Short, formerly mineral technologist for the Missouri Pacific lines, is now engaging in private practice as a geologist and mineral technologist, specializing in industrial raw materials. He is located at 817 Arcade Building, St. Louis 1, Mo.

Russell L. Peters has been elected to directorship of the Inland Steel Co.

H. De Witt Smith, vice president of Newmont Mining Corp., has been elected a director of the St. Joseph Lead Co., succeeding Edward V. Peters, retired.

Clair W. Daniels has been elected assistant secretary of the H. C. Frick Coke Co. and the United States Coal & Coke Co. Mr. Daniels has been associated with the H. C. Frick Coke Co. for the past 11 yrs.

Duncan E. Harrison, formerly located in Denver, is now general superintendent for the Vanadium Corp. of America at Naturita, Colo.

William B. Wallis, president of Pittsburgh Lecomelt Furnace Corp., has been nominated for president of American Foundrymen's Assn. for the year 1948-49.

Victor L. Stevens, formerly general mine foreman for the Howe Sound Co., is now tunnel superintendent for Boyles Brothers Drilling Co. at Polson, Mont.

Thomas E. Gettings has been appointed safety director for both the Lorado and eastern Ohio operations of the Lorain Coal & Dock Co., and the Lorado Coal Mining Co.

Fred H. Haggerson, president of Union Carbide and Carbon Corp., has announced the election of William J. Priestley to directorship. Mr. Priestley has been a vice president in charge of the alloys and metals division since 1945.

W. L. Meadows, formerly manager of the Beckley office of the West Virginia Employment Service, is now a federal mine inspector.

Monroe J. Mechling, formerly with the U. S. Bureau of Mines at Greensburg, Pa., has been named head of the Bureau's new sub-district office at St. Clairsville, Ohio. From this office, inspection in the four northern counties of West Virginia and all of Ohio will be directed.

Harry J. Wolf has joined the firm of Behre, Dolbear & Co., consulting mining engineers and geologists, New York City.

Walter C. Kerrigan, James F. McNamara, and T. H. Wickenden have been elected vice-presidents of the International Nickel Co., Inc., the United States subsidiary of the International Nickel Co. of Canada, Ltd.

James Underhill, after 27 yr of service on the staff of the Colorado School of Mines, has retired. His address is Idaho Springs, Colo.

Arthur S. Hecht, consulting mining engineer of San Francisco, has been appointed consulting engineer for the Department of Commerce, military government, in Korea. He may be addressed at Headquarters USAMGIK, Department of Commerce, APO 235 Unit 2, c/o Postmaster, San Francisco, Calif.

L. A. Norman, Jr., recently assumed his new duties as district mining engineer for the State Division of Mines at Los Angeles. Mr. Norman succeeds W. Burling Tucker who recently resigned.

## — Obituaries —

Thomas Moses, formerly president of the H. C. Frick Coke Co., U. S. Coal & Coke Co., and other coal-producing subsidiaries of U. S. Steel, died Feb.

20, 1948, at age of 78 in the St. Elizabeth Hospital, Danville, Ill.

He retired from his position with U. S. Steel on Aug. 18, 1939, at the age of 70, and was succeeded by his son, Harry M. Moses, the



present head of the coal-mining subsidiaries. After retiring, Mr. Moses served as director of mines for the State of Illinois.

Mr. Moses was born at Audenreid, Pa., Aug. 18, 1869. After attending public grade school and receiving private instruction at home, he later advanced his education by completion of a correspondence course. He was employed in the coal mines of Indiana at the age of 11 and at 14 became a coal miner, as had been his father and grandfather in Wales.

From mule driver in a coal mine he rose to direct the activities of 50,000 men. His fine personality, good humor, and ability earned Tom Moses the respect and friendship of all who knew him.

Archibald Johnston, 83, a director and former president of the Bethlehem Steel Corp., died on Feb. 1, 1948. A graduate of Lehigh University in 1889, Mr. Johnston had been associated with Bethlehem Steel since 1905.

After more than 58 years of continuous service to the Hendrick Mfg. Co. at Carbondale, Pa., William J. Hamilton died on Jan. 27, 1948 at the age of 80.

John Joseph Lincoln, pioneer West Virginia coal operator, died on Jan. 23, 1948, at the age of 82 at his home in Elkhorn. Mr. Lincoln had held the post of vice president, Crozer Coal & Land Co.; vice president, Page Coal & Coke Co.; chairman of the board, American Coal Co. of Allegheny County, New York City; director of the McDowell County National Bank; president, Big Sandy Coal Corp; in addition to various posts with other organizations.

Mr. Lincoln was also a founder and the first secretary of the Pocahontas Operators Assn. and had occupied a post with that organization since its beginning in 1902.

P. H. Nelson of Duluth, Minn., died last November at the age of 74. Mr. Nelson was president of the Greenway Mining Co., Grand Rapids, Minn.

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# NEWS *and* VIEWS

**Eastern**



**States**

## **New Officers Elected on Mining Standardization Committee**

Lucien Eaton, consulting engineer of Milton, Mass., was named chairman of the Mining Standardization Correlating Committee of the American Standards Association at a meeting held on Feb. 19, 1948. The committee is the top technical group in charge of the Association's national standards work in the mining field.

Mr. Eaton has been a member of the Mining Standardization Correlating Committee since 1927 as the representative of the American Mining Congress. He has been active during the past few years in investigations of mining problems in South America and Latin America. In 1946 he was a member of a similar mission to China.

Mr. Eaton succeeds Daniel Harrington, chief of the Health and Safety Service of the U. S. Bureau of Mines, who had been chairman since 1938. Voting their appreciation for Mr. Harrington's long service as chairman, the committee said "all realize how fearless a fighter and how effective a leader he has been in the long campaign to minimize hazards in mining operations."

M. D. Cooper, consulting engineer of Pittsburgh, Pa., representing the groups concerned with coal mining, was reelected vice chairman of the committee.

B. F. Tillson, consulting engineer of Montclair, N. J., representing the groups concerned with metal mining, was elected second vice chairman.

Members of the executive committee are: Richard Maize, secretary, Depart-

ment of Mines, Harrisburg, Pa.; J. J. Forbes, chief, Coal Mine Inspection Branch, and assistant chief, Health and Safety Division, Bureau of Mines, Department of the Interior, Washington, D. C.; David Stoetzel, Jr., Mining Section, Industrial Engineering Division, General Electric Co., Schenectady, N. Y.

Safety standards for rock-dusting coal mines to prevent coal-dust explosions, safety in quarry operations, rules for installing and using electrical equipment in coal mines, fire-fighting equipment and operations in metal mines, and wire ropes for mines were among the subjects discussed by the committee at its meeting.

## **New Mining Institute Forms in Kentucky**

The Green River Valley Mining Institute was organized at a meeting held in Greenville, Muhlenberg County, Ky., January 27. The Institute is to be operated as a nonprofit organization to promote and develop new mining methods, better safety programs, closer cooperation between management and employees, and better public relations.

Arthur M. Wilson, superintendent of the Wicliffe Coal Co., Browder, Ky., was elected president. Other officers include Ward Padgett, superintendent, Crescent Coal Co., vice president; L. S. Loving, manager of the Central City office of Jones & Donan, engineers, secretary-treasurer; Robert J. Hagan, engineer, Crescent Coal Co., assistant secretary-treasurer.

Committees for by-laws, finance, program and membership were ap-

pointed by the president. These committees are made up of supervisory and key personnel of the principal operations of the Green River area. The institute is open to all interested in the advancement of coal mining.

## **West Virginia University Conducts Mining Classes**

Short classes in mining are being conducted at Holden, W. Va., by Page Dickens, extension instructor of the West Virginia University mining extension department. Twenty five-hour classes will be held covering mining, mathematics, ventilation, safety lamps, mine gases, mine fires and explosions, and explosives.

## **Anthracite Conference Scheduled at Lehigh University**

New developments and trends in the mining and utilization of anthracite are to be discussed on May 6-7 on the occasion of the sixth annual Anthracite Conference which will be held at Lehigh University, Bethlehem, Pa. A. C. Callen, head of the department of mining engineering at Lehigh University, is the chairman of the committee planning the session.

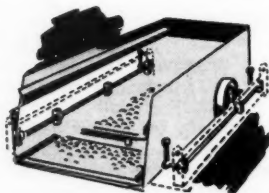
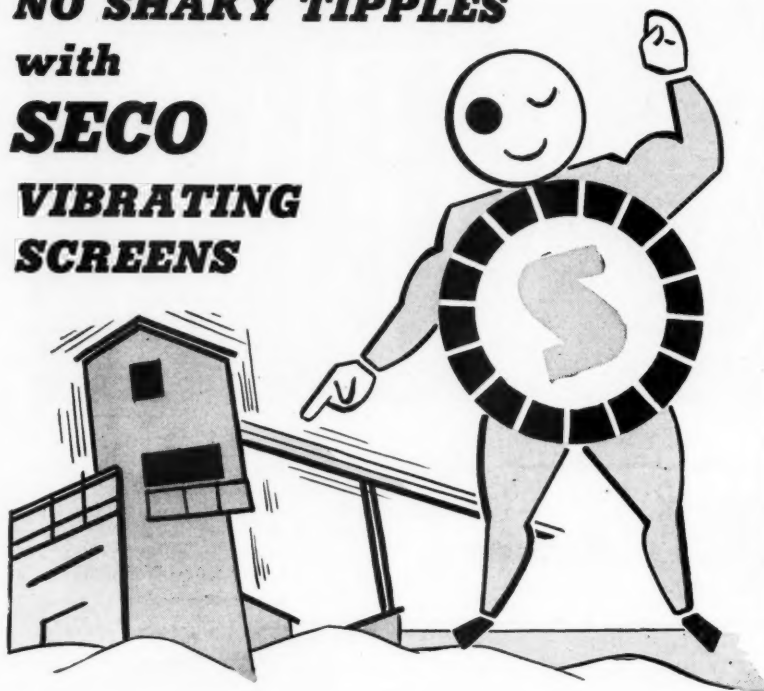
The conference, sponsored by the Anthracite Institute and Lehigh University, is designed to bring engineers, educators, members of the industry, and the general public up to date on the rapid technological progress in Pennsylvania's hard coal industry.

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*Consulting Engineer*

**Mine Mechanization  
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## Coal Production Down

Unusually bad weather interfered with power supply, the ability of miners to turn out on the job, and the surface movement of finished coal in the mine yard, and in rail and water shipment to market.

For the first two months of 1948 a total of 103,000,000 tons of bituminous coal was produced as compared with a production of 112,000,000 tons in the same period of 1947.

## New Railroad Cars Delivery Exceed Retirements

Class I railroads are making a strong effort to replace old freight cars with new equipment as is indicated by the fact that in 1947 a total of 104,595 cars were ordered as compared with 67,046 ordered in 1946. However, during the past few years old cars were retired at a higher rate than new cars were made available. In 1947, a total of 71,331 cars were taken out of service as against 61,004 in 1946. The trend seems to have changed as in December 1947, more than 9000 new cars were built and 5743 cars were taken out of service.

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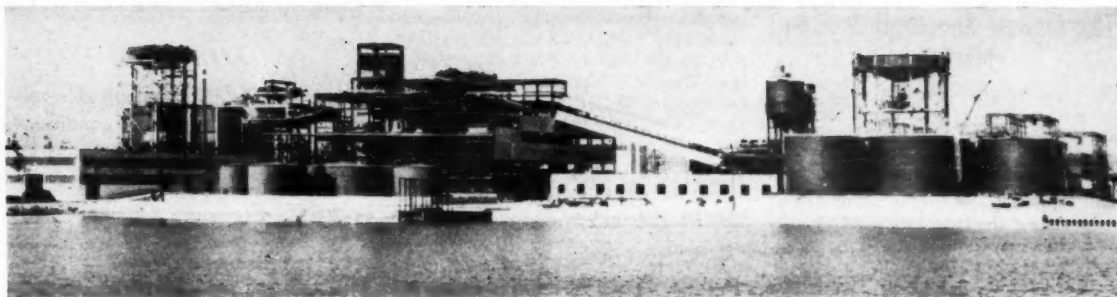
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MINING CONGRESS JOURNAL



The plant of the new Noralyn mine of International Minerals & Chemical Corp. near Bartow, Fla., will boost U. S. phosphate production.

### Noralyn Plant in Operation

The new Noralyn phosphate mine and plant of the International Minerals & Chemical Corp. is now operating. Output of the new mine is expected to attain a production capacity of 1,500,000 tons of phosphate annually, making it the largest mine of its kind in the Western Hemisphere. With an annual present production capacity of 2,000,000 tons from its Peace Valley and Achan mines, also near Bartow, Fla., completion of the new project will give International Minerals & Chemical Corp. a total annual phosphate production capacity of 3,500,000 tons from its Florida fields. The Noralyn mine constitutes one of the richest phosphate beds thus far discovered and it is predicted that it will be in production at least 25 years before exhaustion.

### I. W. Rouzer Relected President of Alabama Mining Institute

Relection of I. W. Rouzer as president of the Alabama Mining Institute was announced at the organization's fortieth annual meeting. Other officers relected were R. T. Daniel and Prince DeBardeleben, vice presidents, and Olin Horton, secretary-treasurer.

Board of governors include J. L. Badham, H. A. Berg, C. S. Bissell, W. F. Cobb, C. F. DeBardeleben, Ben H. McCrackin, A. R. Long, Harold McDermott, Hugh Morrow, P. H. Neal, David Roberts, Jr., and Ben F. Roden.

### Stockpiling Progress

Although the amounts thus far made available by Congress for stockpiling of critical materials had not been fully spent by the end of 1947, the language of the Munition Board's report in requesting appropriations for 1948-1949 stockpile purchase appropriations was notably moderate. The Board seemed to be unalarmed, if not unconcerned, about the inability of the stockpiling program to achieve its aim. At present prices, the Munition Board's stockpiling goal, to

be attained at the end of a five-year program, or the middle of 1951, represents a total expenditure of \$3,154,000,000. The program covers 109 commodities which range from agar to zircon. These materials are divided into three urgency groups but the ultimate goal of each commodity as well as the amount of those commodities already accumulated, remains secret.

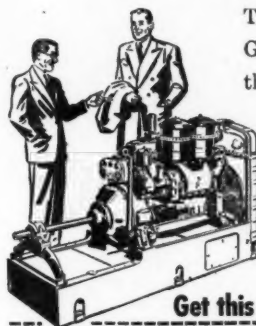
Some \$316,000,000 worth of materials or about 10 per cent of the total is being transferred to the strategic stockpile from World War II surplus. Previous stockpile programs have provided an additional \$81,000,000 worth of materials which are now on hand.

Hence, the purchase program is cut to \$2,757,000,000 or about \$550,000,000 each year for five years.

For the first two fiscal years of the program only \$275,000,000 was appropriated by Congress and for 1948-1949 an appropriation of \$360,000,000 has been requested. Of this sum \$75,000,000 had already been available as of last year in the form of contract authorization.

At the year's end, the Munition Board held an unobligated balance of some \$91,000,000 so that actually only \$184,000,000 had been spent for stockpile purchases by that date and a portion of these purchases has not been delivered even now.

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## Zinc Institute Announces Annual Meeting

A preliminary program has just been released covering the Thirtieth Annual Meeting of the Zinc Institute, to be held at the Hotel Statler, St. Louis, Mo., on April 15 and 16.

On Thursday morning, in addition to reports on the Institute's activities, R. D. Stewart, of United Co-Operatives, Inc., will talk on "What's Ahead for Metals in the Farm Market." Prof. D. G. Carter, of the University of Illinois, will discuss the opportunities for industry in the farm market. R. C. Todd, sales consultant, American Rolling Mill Co., will report on the steel industry in 1948; and R. A. Young, vice president, American Zinc Co. of Illinois, will review the outlook for the zinc smelting industry in 1948.

The Monday afternoon session will open with Washington news by J. D. Conover, secretary of the American Mining Congress. Dr. James Boyd is scheduled to speak on the relationship of the Bureau of Mines and the mining industry; and H. W. Steinkraus will address the meeting on industrial relations.

On Friday morning, Dr. C. L. Wilson, of the Missouri School of Mines, will open the session with "The Min-

ing Engineer's Place in the Current Economy." Qualified speakers will report on the outlook for zinc mining in the Western, Central, and Eastern States; and S. D. Strauss, sales manager, American Smelting & Refining Co., will discuss the world situation in zinc.

The annual dinner and smoker will be held on Thursday evening.

## Power for Mining

According to recent Government statistics there are 8227 mining and quarrying plants in the United States whose total assets, based on Government income tax returns, total \$7,064,900,000. The annual electrical requirements of these plants exceeds 10,700,000,000 kwhr and they have an estimated 6,500,000 installed horsepower. These figures include only metal, coal, and nonmetallic mining operations.

Heavy ice on northern rivers has caused a great deal of difficulty in the operation of hydroelectric plants. Fuel shortages have likewise restricted power output this winter.

Plant expansions have placed further loads on electrical power-generating equipment to nearly eliminate reserve power. Orders on hand to increase present capacity total more

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than 11,000,000 kw but, as three years are required to build and install a large generator, the power supply will be tight for some time to come.

## U. S. Coal Production vs. Europe's

The 620,000,000 tons of coal that was the approximate production of the United States during 1947 about equals the entire production of coal for all Europe including the USSR. During 1947, British coal production is reported to have made a noteworthy comeback. However, the quality has suffered as production increased. The ash content of coal now runs 20 to 30 per cent as against a 10 per cent ash content in the prewar production. Then too, the price of coal has gone up regardless of the decrease in quality and 50c more per ton has been tacked onto the price. An estimated coal deficit of 41,000,000 tons is expected in Europe during 1948.

## Plans Completed for Coal Conversion Pilot Plant

Extensive planning has been completed by the Pittsburgh Consolidation Coal Co., which is now ready to begin construction of a pilot plant to convert coal into gasoline, fuel oil, and gas. A \$300,000 model plant at Library, Pa., will be built and if its operation proves successful and economical the company has announced it will erect a \$120,000,000 full-scale operation in the same region.

## Increased Output Planned at Benson Mines

The Benson iron mines of Jones & Laughlin Steel Corp., located near Star Lake, N. Y., will become the corporation's principal source of ore within a few years, according to a report by Jesse Madson, general superintendent of the mines. Plans call for tripling the output to reach an anticipated annual yield of close to 2,000,000 tons.

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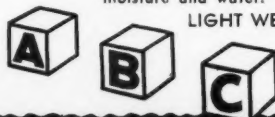
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## Central



## States

### C & H Carries on Development

At the Seneca copper mine north of Calumet, Mich., C & H Consolidated Copper Co., is putting up some development raises and plans a 2000-ft drift to the 33 level of the No. 4 Ahmeek. The drift will penetrate a region which has never been mined.

### Koppers Sole Owner of Granite City Pig Iron Plant

After seven years of operation of the Granite City pig-iron plant by the Koppers Co., sale of the stock of the Missouri-Illinois Furnaces, Inc., partially owned by the Hanna Coal & Ore Corp., makes the plant a wholly-owned subsidiary of Koppers. Pig iron from the Granite City plant supplies a large proportion of the needs of the greater St. Louis area.

### Cleveland Coal Club Elects Officers

In a meeting held in the last week of January of this year, new officers for 1948 were elected by the Cleveland Coal Club as follows: Henry Herdtner, president, district manager of Island Creek Coal Co.; Roy L. Schwartzberg, director of the New York Central System, and George C. Hahn, secretary, local representative of United Eastern Coal Sales Corp.

### Scio-Ohio Pottery Rebuilds

On Dec. 11, 1947, the pottery plant, main industry of Scio, Ohio, was three-fourths destroyed by fire. No insurance covered the loss but the seed of efficient, labor-management relations had created a mutual feeling of interdependence that was not to be discouraged. In addition to the plants' workers, many members of the community pitched in and started to clear away the debris. The Weirton Steel Co. lent a helping hand with steel and equipment and rebuilding operations were under way within a

remarkably short time. On Friday, Feb. 13, 1948, the plant went back into production. Wholehearted cooperation between labor and management marks the operations of the Scio plant both in time of prosperity and time of disaster.

### Mechanical Muckers Tested

Although hand mucking is used in the sinking of the Mather "B" shaft by the Cleveland-Cliffs Iron Co., at Negaunee, Mich., it has been reported that tests are being made with mechanical muckers. Weekly advance averages 25 ft. A second 400-hp motor was added to the 12-ft diam drum hoist now in use in the sinking operation.

### Pumping Operations Progress

Several 2500 gpm pumps are being used by the Galena Mining Co. in dewatering the property of the Eagle-Picher Murphy open-pit mine northwest of Galena, Kans. The water level has been lowered to a depth of 80 ft. At the same time the company is removing overburden to developing the ore. Plans call for the operation of two power shovels to load trucks for carrying the ore to railroad for shipment to the Eagle-Picher Central mill near Cardin, Okla. In addition to this operation, Childress & Sons, owners of the Galena Mining Co., are operating the Mahutska Mining Co. in Oklahoma, where they have reopened the Jeff City mine. They also expect to begin pumping operations at the Vanatta lease in Kansas. The Vanatta development lies in a virgin area west of the Picher field.

### Wisconsin Coal Bureau Elects 1948 Officers

On the occasion of the eighth annual meeting of the Wisconsin Coal Bureau, Inc., the following officers were elected for the current year: Roch P. Botsch, executive vice president of the United Coal and Dock Co., reelected president for the sixth consecutive time; vice president, George M. MacDonald, general sales manager, North Western-Hanna Fuel Co.; secretary-treasurer, Arthur Kuesel, president of the A. Kuesel Coal Co.; directors, William J. Lawson, vice president of the Wisconsin Great

Lakes Coal & Dock Co.; Elmer Kelling, president of Center Street Fuel Co.

Members of the bureau are the coal dock companies located at Milwaukee and the bureau represents all coal dock companies on the west bank of Lake Michigan, north of Chicago.

### Waxachachie Mine to Reopen

The Century Lead and Zinc Co. is preparing to reopen the Waxachachie mine near Quapaw, Okla., on a limited scale. Pumping operations have been underway for some time. It is planned to truck ore production to the Royal mill, southeast of Picher, for treatment. Future plans call for the operation of the mill as a custom concentrator.

### White Pine Mine Ceases Operation

After thorough examination demonstrated that the grade of ore of the White Pine mine was too low for operations under present conditions, the Copper Range Mining Co. of Michigan has ceased exploration activities there. Further work will be confined to shipping ore from the stockpile of the White Pine to the Freda mill for metallurgical tests.

### Weather Causes Heavy Drain on Stockpiles

Coal stockpiles on Duluth-Superior docks have been heavily drawn upon to supply the needs of adjacent areas during a long spell of sub-zero weather that persisted in January and February in northern Minnesota. According to the records the winter of 1947-1948 was the most severe one since 1936.

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### Mine Holdings Change Hands

Holdings of the Marcia K. Mining Co., in the southeast part of the Picher mining field, have been sold to Chicago interests. The exchange included the assets and leases of the Davis-Big Chief Mining Co., whose holdings had been merged with those of the Marcia K. Mining Co.

Claud R. Jones of Miami, Okla., president and general manager of the Marcia K. Mining Co., states that he will continue to be in charge of the operations indefinitely. Plans of the new management for future operations of the properties are not available.

### Rich Strike Reported Near Joplin

A rich strike of lead and zinc ore is reported to be under development in a shallow deposit near Racine, south of Joplin. The new development is being undertaken through an old shaft reopened on the Crawford land. Crawford Brothers and associates are undertaking the work. Ore indications were reported from this vicinity some time ago when drilling was done on the adjoining Winchester land and in recent years by the Bureau of Mines. However, that exploration work was never followed by development.

### Iron Ore Exploration To Be Undertaken

Haley and Young of Hibbing, Minn., have been granted a permit to explore for iron ore in undeveloped mines east of Chisholm. The Minnesota State Lands and Minerals Division estimates that the mines contain 695,000 tons of iron ore with possibilities of 1,000,000 tons. A 54c per ton royalty was included in the terms of the permit.

### Mines Department in Illinois Has New Director

Robert Cruse, a retired mine manager, has been appointed to succeed the late Thomas Moses as director of the Illinois Department of Mines and Minerals. He is the fourth director to hold this post in less than a year.

Robert Medill resigned as director after the Centralia mine disaster. He was succeeded by Harold L. Walker of the University of Illinois, who, in turn, was followed by Mr. Moses last fall.

Mr. Cruse began to work in the coal mines at an early age as a mule driver and for the first 10 years in the mines

he held a variety of underground jobs. In 1910 he became manager of the Cambria mine of the Carterville and Big Muddy Coal Co. From 1919 to 1929 he was manager of the Western Coal Mine Co. mine at Bush, Ill.

In 1929 he became mine manager and assistant superintendent of the Union Colliery mine at Dowell, Ill., and held these posts until the mine was closed last year.

According to reports, the appointment of Mr. Cruse will be favorably received by the miners.

### New Sulphur Operation Under Construction

The first new sulphur mining operation in Texas in more than 10 years will be opened by the Texas Gulf Sulphur Co. when production starts to come from its new properties near Wallisville on the Trinity River. The steel for construction is being shipped on barges by the Consolidated Steel Corp., construction contractors for the new plant at Moss Bluff, Tex. When the mine is in production, sulphur will also be shipped by barge. H. E. Treichler will be general manager of the new operation and C. L. Orr is assistant manager in charge of construction.

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## Union Seeks Increase

With the expiration of present contracts in the Tri-State districts taking place on the thirtieth of June, the Eagle-Picher Local of International Union of Mine, Mill and Smelter Workers (C. I. O.) has outlined a new wage policy with an objective of wage increases of 30 cents an hour in the Tri-State mining field. Mine operators will be served with formal notices of new demands some time in April. Leonard Douglas, a board member of the union, in announcing adoption of the new wage policy, also indicated that the union will support enactment of the subsidy bill by Congress this year and expressed the belief that an amended Russell bill providing subsidies for marginal mines will be enacted.

## Opportunities for Graduate Study Offered at Missouri School of Mines

A recent statement from the Missouri School of Mines and Metallurgy, Rolla, Mo., announced the following industrial fellowships: Shell Union Oil Corp. fellowship for graduate research in petroleum production engineering with a stipend of \$1200; the Ludlow-Saylor Wire Co. fellowship for graduate study of the metallurgical, mechanical, and chemical properties of wire used in weaving of industrial wire-cloth with a stipend of \$1500; the A. P. Green Firebrick Co. fellowship for research in fireclay refractories with a stipend of \$100 a month for ten months; and the Edward Orton Junior Ceramic Foundation fellowship for research in fired ceramic compositions with a stipend of \$100 a month for ten months. Additional sums are granted to each recipient of a fellowship to make up for the cost of certain fees and expenses.

Several opportunities are offered to qualified graduate students for appointments as research fellows and graduate assistants in mining, metallurgy, ceramics, or geology. They carry a stipend of \$750 and \$810, respectively, for the academic year.

## Texas Mercury Mining Ceases

Low returns from the sale of products has forced not only the closure of the few small operators left in the famous old Terlingua mining district of Texas but activities being carried on in the exploration for new deposits and extensions of older workings have ceased entirely. A crew of men under the direction of Robert Pulliam that were engaged in exploration work has been dissolved.

MARCH, 1948

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3 - DISCONNECT SWITCH

4 - KSA CIRCUIT BREAKER OR FUSE



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As shown in the diagram above, a disconnect switch or protective device should be placed in every power line at not over 1500 foot intervals. An overcurrent protective device should be used in each circuit leaving a substation. These can be fuses or circuit breakers of the manual or the automatic reclosing type. (If circuit breakers are employed, trip free operating mechanism should be used.) The exception to this is where a substation feeds the main haulage only and only one haulage unit at one time. In this case only one breaker is required at the station.

There are other important applications—too numerous to mention here. Full details can be obtained by contacting the I-T-E Mining Specialist in your neighborhood. He will be glad to make an application analysis of your electrical distribution system. So use him—at no obligation.

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But, when prices are held down in the face of over-demand, the unscrupulous speculator, by hook or crook, manages to buy at the legitimate market and sell for all the traffic will bear.

This is true whether prices are held down by Government regulation (which breeds "black markets") or by voluntary action on the part of producers (which breeds "gray markets").

Voluntarily, the steel industry has held down advances in the price of steel. Compared to virtually all other commodities, price advances in the last ten years on steel at the mills are extremely modest. Yet, costs of steel making have soared far above normal and the demand continues beyond our vastly increased steel producing capacity.

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Denver, Col.; Oklahoma City, Okla.; Dallas, Tex.; San Antonio, Tex.; Lubbock, Tex.;  
New Orleans, La.; Shreveport, La.

## Mechanized Mine Plans Increased Production

The Ten-X Coal Co. at Roseville, Ohio, is planning development to increase current production of 800 tons per day to 1500 tons per day. A tippie is being erected to handle the production of this new fully mechanized deep mine.

## High Concentrate Cost Closes Zinc Smelter

Although rolling operations are being continued by the Hegeler Zinc Co., their smelter at Danville, Ill., has been shut down because of the high prices of zinc concentrates. The plant was capable of producing about 55 tons of refined zinc daily.

## Steel Is the Sinews of Our Economy

In a recent address before the American Society for Metals in Owosso, Mich., Charles M. Parker of the American Iron and Steel Institute, estimated that from 12,000 to 15,000 lb of steel are in use in the United States for every inhabitant. This amount greatly exceeds the quantity of steel in use per member of the population of any other country. Mr. Parker added that more than 33,600 manufacturing establishments are now using the products of the steel industry. By way of comparison Mr. Parker mentioned that in 19 days of operations at its recent rate of activity the steel industry can produce as large a tonnage as was made in the best years of each of the major nonferrous metals combined.

## Examination Meeting Scheduled

The mining board of the State of Illinois has announced a meeting to be held in Springfield, April 19 and 20, 1948, for the purpose of examining candidates applying for certificates of competency as state mine inspector, mine manager 1st class, mine manager 2nd class, mine examiners, hoisting engineers, and steam and electric engineers. Candidates for examination should apply now for application blanks from the State Mining Board, Department of Mines and Minerals, State Capitol Building, Springfield, Ill.

## Talc to Be Mined in Texas

A new organization entitled the Southwestern Talc Corp. has been formed to conduct operations at Llano, Tex. Bertram Browne, J. B. Upton and O. C. Behse have joined together in capitalizing the new organization for a total of \$5000.

## Western



## States

### Colorado Mining Association Holds Outstanding Meeting

Activities at the annual meeting of the Colorado Mining Assn. held in Denver, February 5-7, culminated with a wildly applauded hand-drilling contest at the famed "Sowbelly Dinner," attended by over 1500 mining men, United States Senators and Congressmen, Western State Governors, and officials. Simultaneously, visiting ladies participated in the "Sourbelles Dinner" and entertainment at a downtown hotel. Among the speakers at the big dinner in the City Auditorium were Hon. John J. McCloy, president, International Bank for Reconstruction and Development; U. S. Senator George W. Malone of Nevada; U. S. Senator Pat McCarran of Nevada; and Gov. Vail Pittman of Nevada. President C. W. Meyers of the Colorado Fuel & Iron Corp., and Vice President Harry McClelland of the Bank of America, San Francisco, were the speakers at the Gold and Silver Banquet on Friday night.

Sessions on economic, geologic, and operating subjects were heavily attended throughout the convention, the principal speakers including Howard I. Young, president of the American Zinc, Lead & Smelting Co., who discussed "The Outlook for Zinc Supplies and Requirements"; Felix E. Wormser, assistant to the president of the St. Joseph Lead Co., on "Common Sense About the Metal Markets"; Donald H. McLaughlin, president, Homestake Mining Co., on "Gold"; Congressman Thomas E. Martin of Iowa on "Our Mineral Policy"; W. W. Lynch, Calumet & Hecla Consolidated Copper Co., on "The Outlook in Copper"; E. H. Snyder, president, Combined Metals Reduction Co., on "Incentives for the Development of the Mining Industry"; Brent N. Rickard, manager, Southwest Ore Purchasing Department, American Smelting & Refining Co., on "Marketing Problems in the Metals Industries"; and Charles H. Dunning, director, Department of Mineral Resources of Arizona, on "What We Need to Maintain or Increase Our Mineral Production."

A number of times during the convention the members of Congress in attendance urged stimulation in the acquiring of metals and minerals for the military stockpile under the Stockpiling Act of 1946. They warned that the stockpiles are dangerously low and insufficient to meet the needs of the

national defense program. Some spoke feelingly from personal experience of the lack of armament which they encountered in World War I and pledged that they will do everything within their power to prevent a further repetition of the shortages experienced both in World War I and World War II.

### Cobalt Exploration

Operations at the Blackbird property of the Howe Sound Co., located near Forney, Idaho, are under the direction of Edwin B. Douglas. Development work indicates that the property has commercial possibilities and it is hoped that it will be brought into production as a substantial producer of cobalt and copper. A tunnel is being driven which is serving to further exploration and which will eventually be used as a haulage tunnel.

### California Gold Operators Discontinue Operations

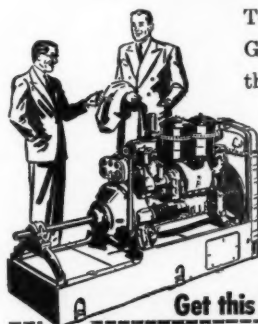
After a six-month attempt to run a profitable operation, all work has been suspended at the Gaston mine, Nevada County, Calif. Operations have been under the direction of E. L. Cleveland, general manager of the Tonopah Divide Mining Co.

As the margin between rising costs and the fixed return from the sale of product narrowed to the vanishing point, the Eagle Shawmut mine in Tuolumne County has been forced to cease operations. The mine and mill has been closed and the machinery and supplies are being offered for sale. This property has been operating since 1938 and has the distinction of being the only gold quartz operator on the Mother Lode to continue large-scale milling during the war period.

### Union Pacific in Third Era of Construction

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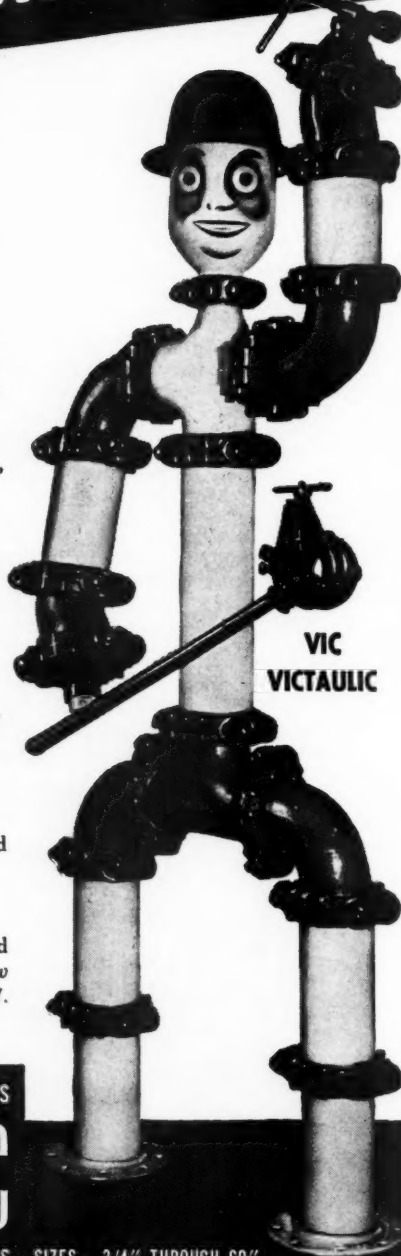
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ready been spent for new equipment and facilities to handle an increased flow of passengers, materials and finished products to and from the area served by the Union Pacific Railroad.

### Copper Mining Film Previewed

After two years of preparation, the Anaconda Copper Mining Co. has released a preview of the natural color film entitled "Copper," which thoroughly depicts the Montana operations of the company including mining, milling, smelting, refining, and lumbering. The preview was shown at the A. C. M. Employees Club in Butte. The underground mining scenes shown in the film are reported to be excellent. One even shows the closeup of a round of blasting in which the short flames coming from the blast holes are distinctly visible. Copies of this film will soon be available for showing and may be obtained from Eugene W. Savage, care of Anaconda Copper Mining Co., Butte.

### Big Blast at Consolidated Chollar

The famous old Comstock mining area recently was the scene of what was probably the largest powder blast ever detonated. It took place in the Consolidated Chollar mine at Gold Hill, Nev. H. V. Dempsey said 9750 lb of powder were used and 80,000 tons of earth were broken by the blast.

### Alaska Mining Curtailed

The paper presented before the Annual Mining Institute, University of Washington, by W. A. Richelsen, consulting mining engineer from Seattle, stated that mining operations in Alaska were on a curtailed basis and that only the large placer operations in the vicinity of Fairbanks and adjoining districts in the Good News Bay region were operating on a full scale. He adds that gold producers can not beat the high costs due to the comparatively high wages paid by Army contractors who were competing for labor. Food costs, high freight rates, in addition to the cost of labor, add considerably to the burden now being placed upon gold producers. Exploration work has been limited. Some work has been done in the Saltchuck region in Kasaan Bay in southeastern Alaska. Considerable activity has been taking place in the Willow Creek district but Mr. Richelsen added that the importance of the copper strike made on Dry Creek along the Glenn Highway has been overestimated.

In closing, Mr. Richelsen stated that conditions on the Canadian side are much better than those that exist in

Alaska and a vigorous exploration program in British Columbia and the Yukon Territory will undoubtedly develop some attractive properties.

### Silver Syndicate Shows Great Promise

The Silver Syndicate mine in the Coeur d'Alene mining district of Idaho may possibly become one of the great silver-lead mines for which this district is noted. It has been said that it may be one of the few major lead ore developments found in the U. S. in the past 30 years.

Its ore shoot has now been proven, through the Sunshine Mining Co.'s 3700 level, which is 1000 ft below sea level, to be 650 ft in length with a strong vein and pay ore streaks in both east and west headings, according to W. M. Yeaman, president.

When the vein was first opened with a 375-ft crosscut it proved to be 12 ft wide with high-grade ore at the point of intersection. This new discovery, says Mr. Yeaman, is similar to the Sunshine ore and runs exceptionally high in silver and copper values.

### Atomic Gold-Recovery Hoax

Atomic formulae have been used as a basis for a hoax in the Pacific Northwest. Some seven persons are accused of collecting approximately \$250,000 from investors around Spokane in a "secret atomic process" to recover gold from black sand. Arrests were made under a Federal grand jury indictment. U. S. Attorney Harvey Erickson stated the accused were charged with conspiracy, using the mails to defraud, and violation of the National Securities Act. The indictments charge that the defendants, in doing business as the Northwest Mining & Engineering Co., conspired to defraud investors by selling them profit-sharing agreements in the "gold-recovery" scheme. The defendants claimed, according to the indictment, that they had located placer claims in Sierra County, Calif., which contained gold values of 40c per cu yd, recoverable only by the "secret process."

### Tungsten Producer Combines Open Pit and Underground Operation

About 400 tons of tungsten ore per day are being produced by the Nevada-Massachusetts Co.'s tungsten mine near Mill City, Nev. About 20 per cent of the production is obtained from open-pit operation with the balance coming from underground workings in different mine units.

# MINE JACKING

# GOES FASTER

# and more safely

# with

# SIMPLEX

# Ratchet Lowering JACKS

No. 1017  
10 TON CAPACITY



### Single Acting Jacks That Lift Full Capacity on Cap or Toe!

Use these single acting jacks for safe, sure operation in mine jacking—for lifting, lowering, pushing or pulling. Double lever sockets speed work in cramped quarters and in angular lifting. All models will lift full capacity on the toe or on the cap—a feature that only Simplex Ratchet Lowering Jacks give you.

Best materials are used throughout for long-life operation under all conditions. When you specify Simplex you get jacks made by the manufacturer awarded the only gold medal for the safety of jacks by the American Museum of Safety.

Ratchet lowering jacks are available in 14 models with capacities ranging from 5 to 35 tons and lifts from 7 to 18 inches. All have two-way standard lever socket except the largest models. Delivered with lever included.

For full information on all types of Simplex mine jacking equipment write for Bulletin Mines 47.

#### SIMPLEX HYDRAULIC JACKS



For hydraulic ease of operation plus complete safety on heavy duty jacking in mines. Available in eight models to handle from 3 to 100 tons—tested to 50% overload. Send for Bulletin HJ 47.

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LEVER · SCREW · HYDRAULIC

## Jacks

TEMPLETON, KENLY & COMPANY  
1042 South Central Avenue, Chicago 44, Illinois

# the Corporation President



## WHO ALMOST SLEPT TOO LONG

T. M. Stanton\* was having a nightmare. For months he'd been preoccupied with the production problems of Empire Gadgets, Inc. So preoccupied, he'd even half-admitted to himself that he was devoting far less thought to national problems than a leading citizen should. But the urgency of his immediate interests kept shoving these concerns into his subconscious mind. Now they were torturing his sleep.

"T. M., old boy," one spectre was saying, "how would you like a nice black depression to come along and swallow up your whole company?" And a green-eyed ogre leered, "While you're neglecting your free-enterprise system, we're moving in with *another* system!"

Stanton's body lurched. "No!" he thundered. Awakened, he scratched his head, murmuring, "Gad, what a dream! H-m-m—wonder what sort of contribution I ought to be making..."

**Here's Something, Mr. President,  
You Ought to Do Right Away!**

Check up on the status of the Payroll Savings Plan in your company. By making U. S. Savings Bonds easily available to your employees "on the installment plan," it benefits not only the employees but your business and the nation as well! Here's how:

(1) The Payroll Savings Plan builds financial security for each participant. The Bonds pay \$4 at maturity for every \$3 invested.

\*This one is fictitious—but it might be any corporation president.

(2) The experience of 19,000 companies operating the Payroll Savings Plan shows that it makes employees more contented in their jobs—cuts down absenteeism—even reduces accidents!

(3) The Plan helps to spread the national debt and thus helps secure your business future. How this works is clearly and briefly described in the free brochure shown below.

### Why Executive Backing Is Vital

Employees still want the benefits of the Payroll Savings Plan. In fact, they *need* the P. S. P., because banks don't sell Bonds on a partial-payment plan—which is the way most workers prefer to buy them. But war-time emotional appeals are gone. Human nature being what it is, the success of the Plan in your company is liable to dwindle unless a responsible executive *keeps promoting it*.

So—today—*check up* on the status of the Payroll Savings Plan in your company. *Act* on your responsibility to see that it is vigorously maintained.

The State Director will gladly help.

**Be sure to read this!** "The National Debt and You," a 12-page brochure, brings you the views of W. Randolph Burgess, Vice Chairman of the Board of The National City Bank of New York—and of Clarence Francis, Chairman of the Board, General Foods Corporation. Request your copy from the Treasury Department's State Director, Savings Bonds Division.



The Treasury Department acknowledges with appreciation the publication of this message by

## MINING CONGRESS JOURNAL



This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.



## Bureau of Mines Moves Alloy Research Unit

According to a recent announcement by Director James Boyd, the alloy research work now being conducted at the Bureau of Mines experimental station at Salt Lake City will be moved to stations nearer the center of alloy activity. The alloy work will be replaced by an even greater amount of metallurgical activity, the results of which should be more beneficial to the immediate vicinity of the experimental station than the alloy research work now being conducted there.

## New Activity in Uranium

Recently the Atomic Energy Commission purchased the Monticello, Colo., vanadium mill from the WAA, a move which indicates that the Commission might go into the production of uranium. The Commission is also doing extensive work at its Grand Junction uranium mill. David E. Lillenthal, chairman of the Atomic Energy Commission, has indicated that steps will be taken in the near future to begin the purchase of uranium ore at a price that will afford the producers a reasonable profit.

Blair Burwell, of Grand Junction, Colo., has been active in attempting to interest the Atomic Energy Commission in fixing a price for uranium that will encourage the independent mine owners to develop their property and begin the large scale production of carnotite ore from the known reserves in the southeastern Utah and western Colorado areas.

## Modernization and Expansion at Day Mines

New and modern equipment is being installed in the plans being carried out to increase the capacity of the Monitor milling plant of Day Mines, Inc., in the Coeur d'Alene, from 215 to 480 tons daily. The plant is milling ore from a group of the Day mines. Ore is delivered to the mill through the Carlisle tunnel.

## Jumbo Mill Completed

A new 500-ton amalgamating mill at the Jumbo mine of the Austin Brothers Gold Mining Co., Humboldt County, Nev., was turned over successfully, running out ore. Continuous operation of the plant will not begin prior to March 1. It has been estimated that the Jumbo ore can be mined, crushed, and delivered to the mill bin at a cost of 35¢ per ton.

## — BOOK REVIEWS —

**AN INTRODUCTION TO METALLURGY—Second Edition.** By Joseph Newton. Published by John Wiley & Sons, Inc., New York, N. Y., 1947. 645 pages. \$5.50.

**C**OINCIDENT with the rapid broadening of the field of metallurgy comes the need for a new and large foundation upon which students of the subject can build their knowledge in general and advance to more specialized fields. This second edition of a standard metallurgical text serving as an introduction to the field of metallurgy will be welcomed by the engineering schools. As in the first edition this new volume is divided into two parts covering adaptive and extractive metallurgy. The solution of illustrated problems is used as a method of fixing the principles and various metallurgical processes in the mind of the student. Much of this second edition has been rewritten and a great deal of material has been added to bring the subject up to date. Outstanding metallurgists have contributed their criticism and suggestions to enable the author to make this book a valuable "must" volume for the metallurgical student and the practicing metallurgist.

**NON-FERROUS PRODUCTION METALLURGY.—Second Edition.** By John L. Bray. Published by John Wiley & Sons, Inc. New York, N. Y., 1947. 587 pages. \$6.00.

**F**ROM a general knowledge of the practice of metallurgy, the student specializing in non-ferrous production metallurgy advances to the processes that are identified with the production of each particular metal. The publication of the first edition of this standard work in 1940 was wholeheartedly welcomed by the engineering schools in the United States and by practicing engineers who have frequent occasion to refer to the processes in use.

In the past eight years the rapid development of wartime industries has warranted the publication of the second edition. Material deleted from this edition is usually covered in the introductory metallurgical courses that students in metallurgical engineering are required to take. Illustrated problems have been added to show the methods used in the calculation of furnace charges, gas volume, and recoveries. A new chapter has been added discussing the application of physical chemistry to metallurgical processes. The wartime developments in aluminum, magnesium, nickel, and tin have formed the basis for additional material on these metals.

To each chapter has been added a discussion of the strategic position of this country with respect to the metal concerned. This information will be extremely valuable in appraising the metallurgical engineering student of this country of the great importance of a balanced production of the various metals so essential to our industrial economy; not only for peacetime needs but for the increased demands which may arise in the event of a national emergency.

**TAXCO, MEXICO'S SILVER CITY**  
—By Edwin J. Foscoe. University Press in Dallas, Southern Methodist University, Dallas, Tex., 1947. 31 pages. \$1.00.

**P**UBLISHED as No. 2 in the American Resort Series, this interesting little booklet will appeal to the many American mining engineers who have spent time in Mexico. The author traces the historical development of the colonial mining town of Taxco from the time of its discovery by Cortez in the 16th Century down to the current operation of the Taxco unit of the Minas de Guerrero of the Eagle-Picher Mining and Smelting Co.

Although the Indians knew and worked the rich silver minerals in the Taxco district, it was not until the coming of the Spaniards that mining became important to the region. The Spaniards, in their desire to produce the riches of the New World, originally developed the area with the mistaken idea that the metal produced was tin. This misconception was shortlived, and for two and one-half centuries between 1585 and 1815 silver produced from the mines of Taxco added immensely to the richness of Spain. In the early Nineteenth Century, the mines in the vicinity of Taxco declined. They were revived again under the progressive regime of Porfirio Diaz.

In recent years with the completion of a highway from Mexico to Acapulco, Taxco has again assumed importance as a mining camp. Silver is no longer the predominant mineral. Since February, 1943, the 800-ton modern flotation mill of Eagle-Picher Mining and Smelting Co. has been treating about 20,000 metric tons of low grade lead-zinc ore per month. Since that time production has exceeded 60,000 tons of zinc and 25,000 tons of lead.

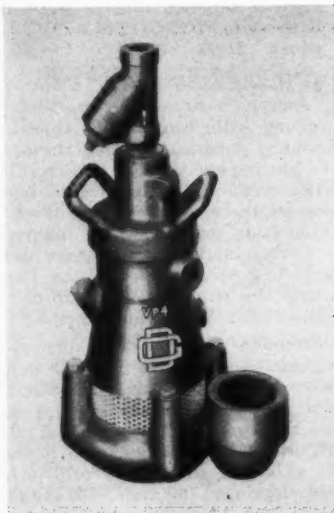
**Plan Now to Attend  
Metal Mining Convention  
September 20-23  
San Francisco, Calif.**

# MANUFACTURERS FORUM

## Top Suction Sump Pump Announced

Designed to overcome one of the most common causes of pump failure—breaking of the pump shaft seal because of water pressure—a sump pump, known as the VP-4, has just been announced by the Gardner-Denver Co.

The design of the VP-4 embodies a



principle called "top suction." Because of this feature the company claims the oil seal of the VP-4 is subjected only to static pressure from depth of immersion when the pump is not in operation. When the pump operates, water cannot reach the oil seal on the vane-type air motor.

## Loader May Be Used as Scoop or Shovel

A new reversing fixture for the tractor-mounted Stockland "Hydro-Scoop" converts this hydraulically-operated earth mover into an all-purpose power shovel for handling bulk materials in industry. Hand



shoveling is eliminated in moving materials in and out of stockpiles, loading and unloading cars, shoveling snow, etc. Designed as an earth mover for all hydraulic-lift, farm-type tractors, "Hydro-Scoop" has a capacity up to 10 cu ft.

## Coal Cleaning Trend

The Deister Concentrator Co., Fort Wayne, Ind., announces that the need for better cleaning and more complete recovery of finer sizes as mechanization increases in the coal mining industry is reflected in an unprecedented demand for their SuperDuty Diagonal Deck Coal Washing Tables. As mounting labor costs bring more underground machinery into action, bituminous producers generally have realized the necessity for precise cleaning into the extremely fine sizes, which

the company says is practically and economically possible with these tables. The company reports that while such equipment has been used in large numbers for many years on anthracite coal and in lesser numbers for the cleaning of the more difficult bituminous coals, notably in the Alabama field, units are now in operation or in the course of installation or planning in large and outstanding bituminous preparation projects of the following companies: H. C. Frick Coke Co., Hanna Coal Co., Jones & Laughlin Steel Corp., Republic Steel Corp., Bethlehem Steel Corp., Semet-Solvay Co., Rochester & Pittsburgh Coal Co., Consolidation Coal Co. (Ky.) and Inland Steel Co.

Full information regarding this equipment in its application to coal cleaning is available upon request of the company.

## Vibrating Unit Speeds Unloading of Frozen Coal

An electric-powered vibrating unit that unloads frozen coal from hopper-type railroad cars in an average of less than 10 min and speeds the turnaround time for these critically short cars, was given its first public demonstration at the Inland Steel Co.'s Indiana Harbor works in January. The new device, the Robins Car Shakeout, produced by the Robins Conveyor Division of Hewitt Robins, Inc., replaces the manual method used by many industries, which requires up to 20 men

with sledge hammers, pickaxes, poke bars, and shovels to empty a single frozen car.

The 5-ton Shakeout is placed astride the sides of the car to be unloaded by a hoist. In operation, it sets up rhythmic harmonics within itself—more than 1000 impulses a minute—which are transmitted by contact to the car and its entire contents. Since no men are required to be in or on the car during the operation, safety for the unloading crew also is greatly increased.



## Electric Portable Compressor Announced

The Davey Compressor Co., Kent, Ohio, announces a new line of electric portable compressors in 60, 105, 160, 210, 315 cfm capacities.

Available in skid, two-wheel trailer and four-wheel trailer mountings, the new units will be known as Air Chief "Electrics." They will serve as a companion line to Davey's 1948 gasoline and Diesel models.

Compressors are of two-stage construction with inter-cooler and safety valve. They are direct driven from 1200 rmp, 220/440 v a c motors of squirrel cage, horizontal type.

## Light-Weight Drill Offers Flexibility

Ingersoll-Rand Co. announces a new, light-weight wagon drill designed for use in the construction, building, and mining fields. Known as the Wagonjack, the machine combines the drilling stability of a wagon drill with the portability of a jackhammer. Light-weight construction, centralized controls, and ball-bearing, pneumatic - tired wheels allow the machine to be transported, set



up, and operated by only one man.

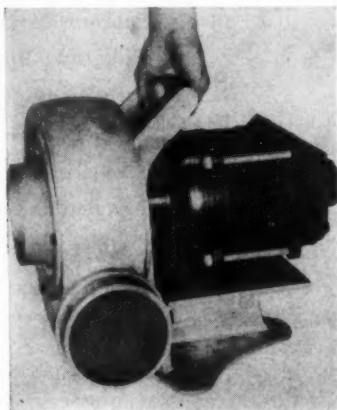
Capable of mounting either the J-50 jackhammer or the DA-30 drifter, the Wagonjack features a chain feed which is driven by a vane-type air motor. Adjustable anchors permit taking up slack in the chain. A self-locking worm gear prevents the drill from jumping forward when a soft spot is encountered. Control handles for both the drill and the air motor

are grouped on the air motor mounting, which may be raised or lowered on the tower to suit the operator.

Extreme flexibility in setting up the drill on uneven terrain is provided in this adjustable mounting which permit the drilling of holes at any angle from the horizontal to the vertical positions. Greater drilling speed and elimination of operator fatigue is claimed.

## Lightweight Fan Has High Capacity

A new electric motor-driven ventilator called "Saf-T-Air" has a capacity of 425 cu ft per min yet weighs only 50 lb. One man can carry it by a balanced handle which has been



placed over the center of gravity so that the unit cannot tip over when carried or hung. Made of noncorrosive, spark-proof aluminum, "Saf-T-Air" can be connected with the nearest lighting of power supply outlet without danger of overloading. Its compact size allows it to pass through small hatchways and hard-to-get-to places.



Rock drills at Granby Dam, part of the Colorado-Big Thompson project, afford a rugged test for Goodyear Redwing hose, a new type designed especially for severe abrasive operations. The earth-filled dam will be 885-ft long and 232-ft high, providing storage for more than 482,000 acre-ft of water.

## Announcements

Edwin H. Johnson has been appointed sales manager of the mining division of Kennametal Inc., according to a recent announcement by W. D. Turnbull, general sales manager.



Edwin H. Johnson

of the Republic Steel Corp.

In this capacity Mr. Johnson will supervise the sales and field development of all Kennametal tools that are used in metal and nonmetallic mining, quarrying, and construction. Mr. Johnson was formerly chief engineer

Quinton Engineers, Ltd., 816 South Figueroa St., Los Angeles, announce the addition to their staff of Clay Colley, formerly engineer for the Link-Belt Co., Pacific Division.

Election of W. A. Roberts and W. C. Johnson, executive vice presidents of Allis-Chalmers Mfg. Co., to the firm's board of directors has been announced by Walter Geist, company president.

Roberts is executive vice president in charge of the company's tractor division, while Johnson is executive vice president for the general machinery division.

The new directors succeed the late Dr. Charles E. Albright and Harold S. Falk, president of the Falk Corp. Falk had submitted his resignation because of weight of other business.

William A. Fowler, general manager of the Columbus plant of the Timken Roller Bearing Co., retired January 31, under the retirement plan of the company. L. D. Gable, factory manager of the Columbus plant for the past three years, becomes general manager.

Link-Belt Co. announces the removal of their Pittsburgh district sales office to the former McKay residence at 5020 Centre Ave., Pittsburgh 13, as the first step in a program designed to expand the company's facilities in western Pennsylvania. The Pittsburgh office is headed by Otto W. Werner, district sales manager.

The Ohio Brass Co., Mansfield, Ohio, recently announced two changes in its district sales organization. T. J. Harris, present district manager in Kentucky and Tennessee, is being transferred to the Chicago office, where he will take over the territory formerly handled by the late Carl Burkhalter. Paul E. Wright has been appointed to succeed Mr. Harris.



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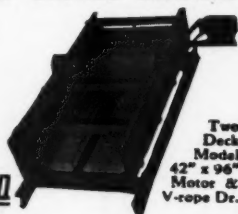
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MINING MACHINE AND  
LOCOMOTIVE CABLES

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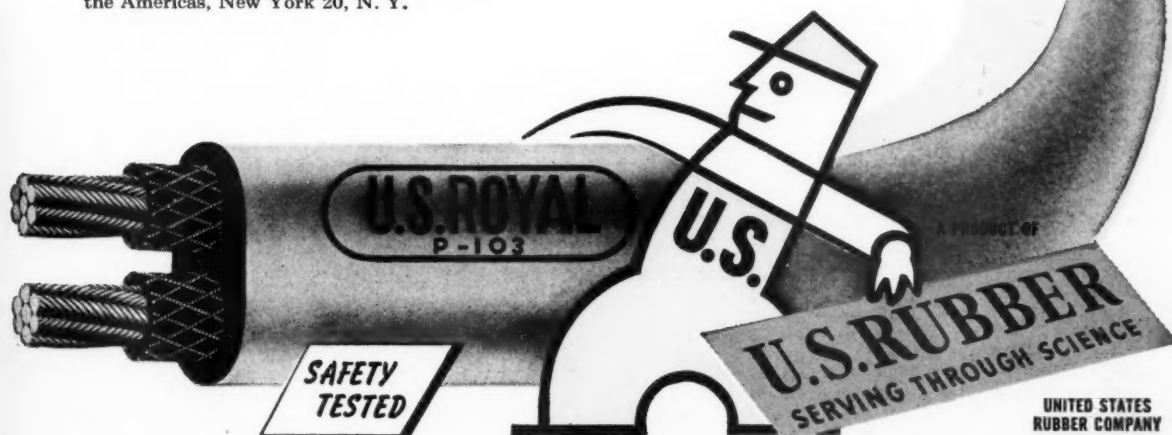
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**MORE SAFETY**—The conductors are of annealed coated copper, the stranding of which is designed *specifically* for mining machine and locomotive cables. The copper insures top physical and electrical qualities and the greatest possible flexibility and efficiency.

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*a **must**  
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modern mining:*

**unfailing light**  
**at the working place**



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The ever-increasing importance of *teamwork* in today's mining puts heavy emphasis on the *dependability* of production equipment, particularly the miner's personal cap lamp.

Light must not fail, for any member of a working group, if full production is to be maintained.

The EDISON Electric Cap Lamp provides unrivalled dependability for the wearer—unfailing, brilliantly effective light at the working place throughout the entire shift—and holds a more than thirty-year record of sterling performance. May we show you in a practical demonstration the reasons-why?

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